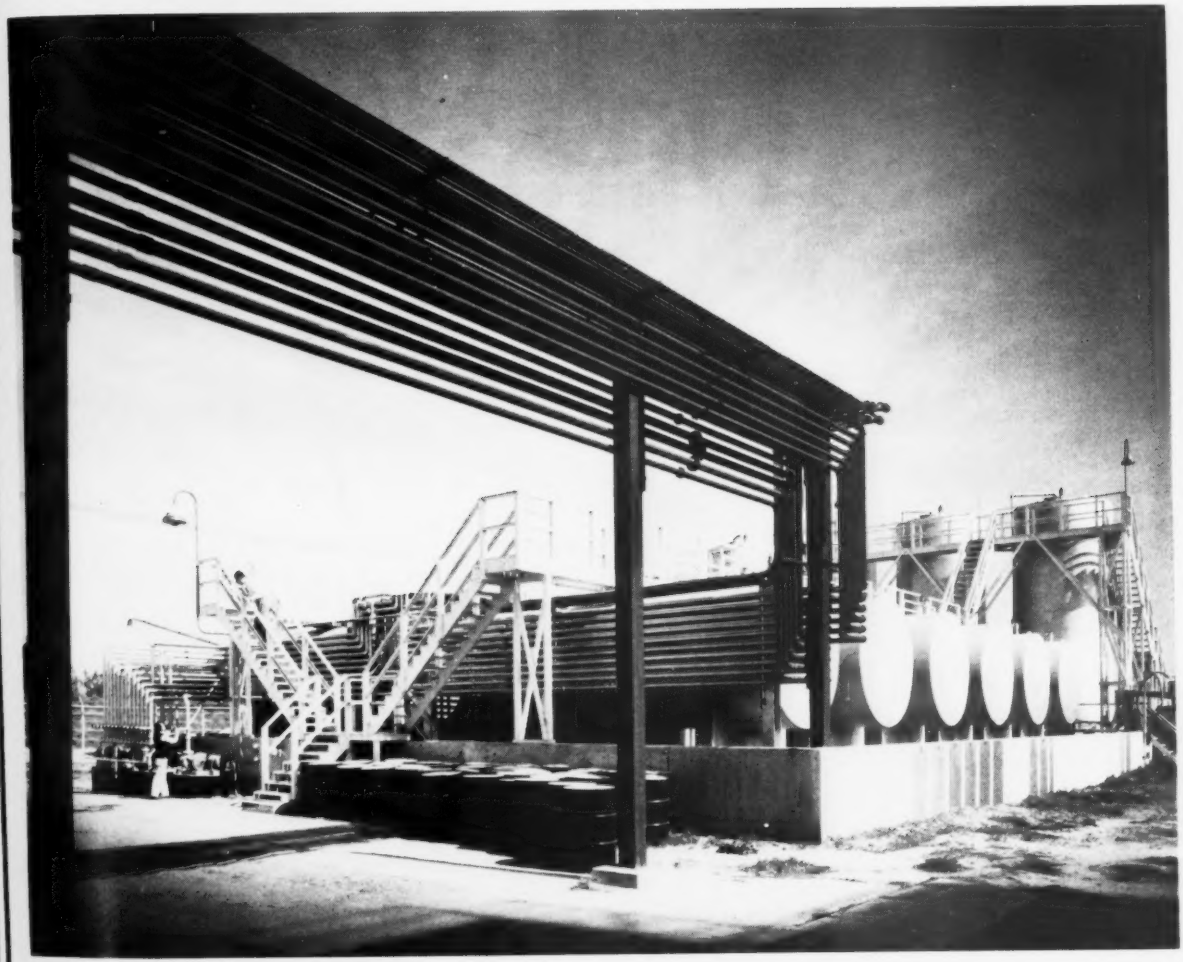
Western Industry

May 1953

Beauty as well as utility is possible even in tank farms and process piping.
. . . See page 28



Your pump troubles: how you can correct them . . . page 33

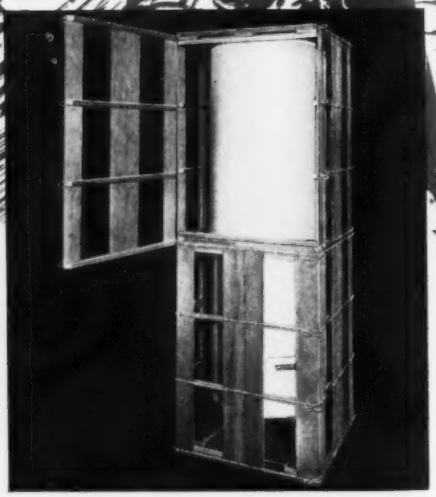
Safety in radio-active chemical processing . . . . page 37

Statistical quality control: its ABC explained . . . . page 38

A special section on

PLANT DESIGN and CONSTRUCTION

. . . pages 41-95



You get more from CABCO

Uniformity...equal strength, equal size, equal lightness. Cabco engineers go to great lengths to insure precise uniformity in every kind of shipping container we make. From timber-stand to finished product, we perform every step ourselves. This one-company supervision of manufacture assures that every Cabco wirebound you buy gives your product the travel protection you want. This high order of uniformity is another reason why Cabco is the West's foremost manufacturer of wooden shipping containers—and has been since 1883.

CUSTOM DESIGNED DOUBLE-MAT CABCO wirebound crate for 275 lb. Wesix electric water heater saves 50 lbs. shipping weight, 45 minutes assembly time over nailed crates. Double mats are joined firmly by 2 channel blocking pieces at the mid-point. Wire loop closures insure quick opening and closing for inspection. Top and bottom blockings are cut round to grip heater snugly. Wirebounds stack flat, save storage space.

Sold only by

DUFF CALIFORNIA CO.

100 Bush Street, San Francisco 4 • 2581 E. Eighth Street, Los Angeles 23
501 Dooly Building, Salt Lake City 1

2761

Cabco containers are a product of the California Barrel Company, Ltd., the West's foremost designer and manufacturer of wooden shipping containers

B.F.Goodrich

TW ANALYSIS cuts industrial tire failures, saves you up to 50% on tire costs

WHAT caused your last industrial tire failure? Overloading, oily floors, rough hauling surfaces—all possibilities—or was it the *tires themselves?* If so, chances are that with the *right* tire you can increase tire life—perhaps even double it. Like the equipment they carry, industrial tires are designed to do specialized jobs. Point is, get the specific tire and job together.

B. F. Goodrich has developed the Tire and Wheel Analysis Plan to help you do just that. Without obligation, a trained BFG man will study your materials handling operations and recommend the right tires for you to use. His advice will be impartial, for B. F. Goodrich makes, and BFG retailers sell, a complete line of industrial tires.

Use the tires designed for the job and you'll save as much as 50% on tire and wheel costs through greater materials handling efficiency, less expensive maintenance and repair time.

To find out more about this free B. F. Goodrich Tire and Wheel Analysis Plan, send in the coupon or call your BFG retailer. A special TW Analysis Plan is available for manufacturers of industrial handling equipment.

Always specify B. F. Goodrich tires when ordering new equipment

The B. F. Goodrich Co.
Department TW-55, 5400 E. Olympic Blvd.
Los Angeles 22, California

Please send me:

☐ *Additional information* on your new Tire and Wheel Analysis Plan.

☐ A free copy of your "Industrial Tire Guidebook".

Name_____

Title_____

Company_____

City_____ State_____

Western Industry

CONTENTS

MAY • 1953

Volume XVIII, Number 5

ARTICLES

CORRECTING PUMP TROUBLES 33

What to do in case of failure of the pump to deliver water, reduced capacity and pressure, loss of prime, overload on motor, vibration and other difficulties

FISSION SAFETY SOUGHT 37

Atomic Energy Commission's reactor station at Arco, Idaho, sets up pilot plant to make radioactive chemical processing safe in populous areas.

ABC OF STATISTICAL QUALITY CONTROL 38

Doesn't require adding a mathematics professor to your staff. On the other hand, it's a simple manufacturing tool for plants of any size.

NUT CRACKING BY ELECTRICITY 40

PLANT DESIGN SECTION

Introduction 41
How the Building Dollar Is Divided Up 42
Choosing the Contractor 43
Soil Conditions Govern Your Foundation 44
Site Cost Factors 46
Good and Bad Use of Administrative Space 48
Logistics Planning 51
Electrical and Mechanical Costs and Requirements 56
Selection of Materials 62
Choosing Your Process 64
Auxiliary Structures 67
Costliness of Obsolescent Equipment 68
Budget Control of Costs 74
Lighting Considerations 76
Use of Color 82
Materials Handling 83
Layout for Hazardous Materials 84
Mechanical and Electrical Planning 87
Selection of Equipment 90
"Package Deals" vs. Individual Construction 94

DEPARTMENTS

Editorials 20
Letters 22
Calendar of Meetings 24
This Month's Cover 28
Helpful Literature 96
Materials and Equipment 101
Westerners at Work 116
Associations Elect 119
Western Trade Winds 120
Classified Advertising 123
The West On Its Way 125

ADVERTISERS IN THIS ISSUE 124

Editor
A. C. PRENDERGAST

Managing Editor
John J. Timmer

Assistant Editor
Robert S. Wood

News Editor
Patricia N. Mann

Consulting Technical Editor
C. LLOYD THORPE

Consulting Editor
Electricity and Electronics
ROY C. HENNING

Consulting Editor
Industrial Development Planning
W. J. O'CONNELL

★

Correspondents
O. N. Malmquist
c/o Salt Lake Tribune
Salt Lake City 1, Utah

L. E. Thorpe
604 Medical Arts Bldg.
Seattle 1, Wash.

★

District Offices

NEW YORK OFFICE
Richard J. Murphy, Eastern Manager
107-51 131st Street
Richmond Hill 19, New York
Telephone Jamaica 9-2651

CLEVELAND OFFICE
Clifford E. Beavan, District Manager
3307 E. 149th St., Cleveland 20, Ohio
Telephone SKyline 1-6552

CHICAGO OFFICE
A. C. Petersen, District Manager
3423 Prairie Ave., Brookfield, Ill.
Telephone Brookfield 532

SAN FRANCISCO OFFICE
V. C. Dowdle, District Manager
609 Mission St., San Francisco 5, Calif.
Telephone YUkon 2-4343

LOS ANGELES OFFICE
Jerome E. Badgley, District Manager
128 So. Mansfield Ave., Los Angeles 36
Telephone WEbster 8-8512

PACIFIC NORTHWEST
Arthur J. Urbain, District Manager
609 Mission St., San Francisco 5, Calif.
Telephone YUkon 2-4343

25c per Copy $2.00 per Year

Published Monthly by
KING PUBLICATIONS
609 Mission Street
San Francisco 5, Calif.
Telephone YUkon 2-4343

James I. Ballard . . . . . President
Franklin B. Lyons . Vice President
L. P. Vrettos . . V. P. & Treasurer
E. F. Hubbard . . Circulation Mgr.
Maida Rector . . Production Mgr.

Please address all communications to the San Francisco Office

CCA NBP

Acceptance under Section 34.64
P. L. & R. authorized.

Copyright, 1953 by King Publications.

Pacific

ELECTRIC DU-AL FURNACES

FOR TOOL ROOMS, LABORATORIES & PLANTS IN SMALL PRODUCTION OR METALURGICAL EVALUATION

The Pacific Du-Al furnaces are compact, efficient and economical, with automatic control panel. Designed to fit either stand, dual quench tank or the Pacific Atmosphere Generator. Automatic temperature control insures close heat tolerance and high quality product control. These furnaces are in production and are available.

PACIFIC DU-AL 1350

Automatic, full temperature range from 250°F. to 1350°F. Suitable for tempering and drawing of tool, die steels or treating non ferrous metals. Nickel-chromium heating elements, parallel type door, rear mounted fan.

Wired, ready for operation.

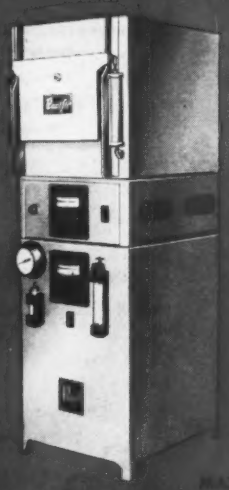
MAXIMUM TEMPERATURE 1350°F.

PACIFIC DU-AL 1850

Automatic, built to stand continuous operation. Air actuated door. Full muffle chamber permits use of atmosphere. Suitable for carbonizing, nitriding, carbonitriding and all general work up to 1850F.

Comes wired ready for operation.

MAXIMUM TEMPERATURE 1850°F.



PACIFIC DU-AL 2350

Multi-purpose, designed for treating high-speed steel. Automatic, for using controlled atmosphere. Chamber is full-refractory lined, heated with Alloy 10 elements. Air actuated door gives gas-tight seal. Rugged and highly efficient.

Wired ready for power hookup.

MAXIMUM TEMPERATURE 2350°F.

PACIFIC SCIENTIFIC CO. ENGINEERS are accustomed to answering the "$64 questions." If you have a heat treating problem, a phone call will bring a competent heat-treating engineer or service man to assist you in designing new equipment or maintaining your present equipment. Call our nearest office today!

Pacific SCIENTIFIC CO.

LOS ANGELES 1430 Grande Vista Ave. **SEATTLE** 1915 1st Ave. South
SAN FRANCISCO 25 Stillman St. **PORTLAND** Terminal Sales Bldg.

For product information from these manufacturers call Pacific Scientific Co.: AUTOMATIC TEMPERATURE CONTROL CO., COATES ELECTRIC CO., INDUCTION HEATING CO., LEWIS ENGINEERING CO., LINK ENGINEERING CO., THE MB MANUFACTURING CO., PARTLOW CORP., TINIUS OLSEN TESTING MACHINE CO., WILSON MECHANICAL INSTRUMENT DIVISION (American Chain and Cable Co.)

When You Need Better Chain...

Get the Best

GET *Round* CHAIN

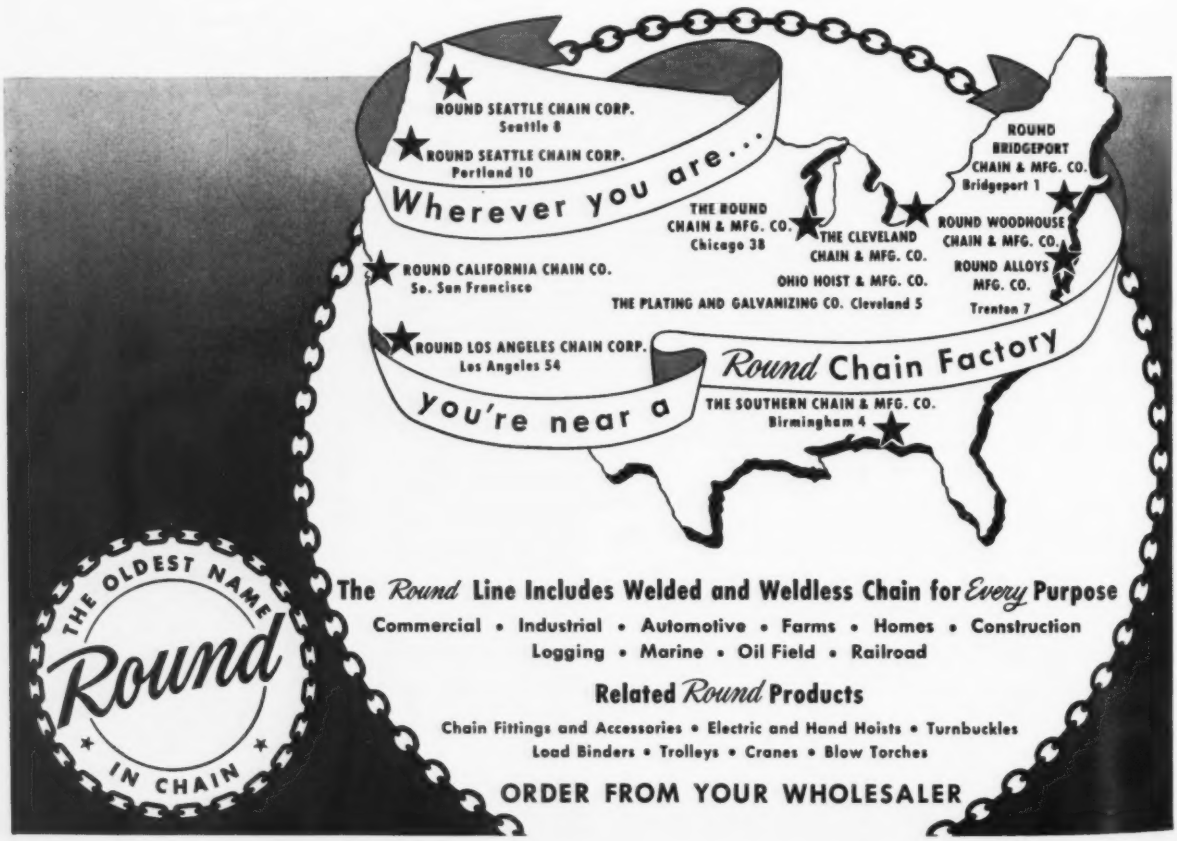
*Out*side, *Round* Chain, made by *Round* Chain Companies, might *look* like other chain, but there the similarity ends. *In*side, *Round* Chain is superior—superior because it is the result of generations of chainmaking experience . . . PLUS recent new developments by *Round* metallurgists.

This experience and these developments make possible chainmaking advantages like these:

- Choosing the kind of raw metal best suited for making each type of chain.
- Forming and welding techniques which assure maximum link strength.
- Heat treating in special furnaces with automatic controls for maximum hardness and toughness.
- Producing at a rate consistent with quality control.
- Inspecting by microscope and spectroscope to check on physical composition and to detect flaws.

Next time you need chain, remember it's what is *inside* a piece of chain that determines the service and life you'll get from it. Today as always, the INside of *Round* Chain is the source of its superiority . . . is the factor that enables it to merit the term "BEST".

Next time, get the BEST. Get *Round* Chain.



The *Round* Line Includes Welded and Weldless Chain for *Every* Purpose

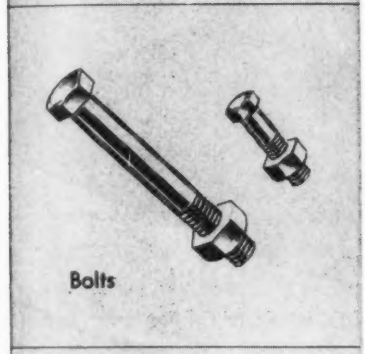
Commercial • Industrial • Automotive • Farms • Homes • Construction
Logging • Marine • Oil Field • Railroad

Related *Round* Products

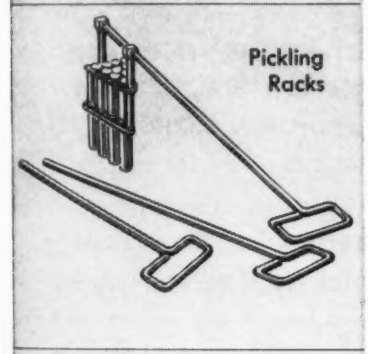
Chain Fittings and Accessories • Electric and Hand Hoists • Turnbuckles
Load Binders • Trolleys • Cranes • Blow Torches

ORDER FROM YOUR WHOLESALER

Piston Rods

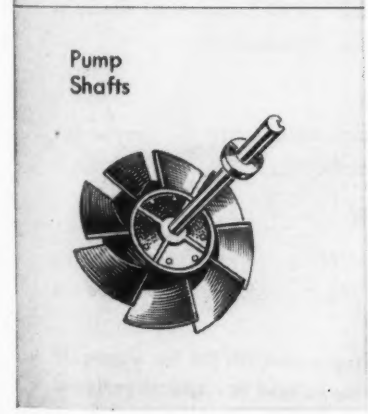


Bolts



Pickling Racks

Pump Shafts



HAYNES Alloy Bar Stock

Trade-Mark

FOR SEVERE SERVICE CONDITIONS

Four different HAYNES alloys are available in hot-rolled and forged bar stock for the fabrication of parts subjected to heat, corrosion, or oxidation. Each alloy has an unusual combination of properties to combat certain severe service conditions, as indicated by the chart below. Typical parts made from HAYNES alloy bar stock are piston rods, valve stems, pickling racks, pump shafts, bolts, needle valves and forgings such as automotive valves and turbine blades.

Round bars are available in diameters from 3½ in. down to ¼ inch. Rounds larger than 3½ in. in diameter can be obtained as hot forgings.

HAYNES alloy bars can be turned, ground, drilled, tapped, reamed, threaded, and welded.

For further information about HAYNES alloy bar stock, contact the nearest Haynes Stellite Company district office.

USE BAR STOCK OF	FOR RESISTANCE TO
HASTELLOY Alloy B (nickel-molybdenum-iron)	Hydrochloric acid, wet hydrogen chloride gas, sulphuric acid, phosphoric acid, organic acids, high temperatures.
HASTELLOY Alloy C (nickel-molybdenum-chromium-iron)	Nitric acid, free chlorine, acid salts, hydrochloric acid, sulphuric acid, phosphoric acid, organic acids, sulphurous acid, high temperatures.
MULTIMET Alloy (cobalt-chromium-nickel-iron)	Oxidation, high temperatures.
HAYNES Alloy No. 25 (cobalt-chromium-tungsten-nickel)	Oxidation, high temperatures, carburization, wet chlorine, nitric acid.

HAYNES alloys

TRADE-MARK

"Haynes," "Hastelloy," and "Multimet" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

INCREASE LIFE EXPECTANCY of REFRACTORY LININGS WITH IMPROVED DFC HIFIRE BRICK

Recent Denver Fire Clay Company plant improvements...new production techniques . . . greater quality control...teamed-up to bring you a better DFC HIFIRE BRICK than ever before.

A DFC HIFIRE BRICK that increases the life expectancy of refractory installations.

A DFC HIFIRE BRICK that offers superior qualities in DENSITY—HARDNESS—HIGH TEMPERATURE RESISTANCE—LOW SPALL—UNIFORMITY — MECHANICAL STRENGTH — REHEAT SIZE.

DFC REFRACTORY DISTRIBUTORS:

ARIZONA
Phoenix Brick Yard
P.O. Box 768
Phoenix, Arizona
Carlson's Brick & Builders Supply Company
3670 East Speedway
Tucson, Arizona

CALIFORNIA
W. E. Mushet Company
725 Bryant Street
San Francisco, California

IDAHO
Pocatello Lumber Company
Pocatello, Idaho
Morrison-Merrill & Company
323 South 23rd Street
Boise, Idaho

MONTANA
Monarch Lumber Company
Bozeman, Montana
Lovell Clay Products Co.
Billings, Montana
Monarch Lumber Company
913 8th Avenue N.
Great Falls, Montana
Builder's Supply Co.
P.O. Box 176
Helena, Montana

NEBRASKA
Cox Lumber Company
Scottsbluff, Nebraska

NEW MEXICO
Santa Fe Builders Supply Co.
P.O. Box 1357
Albuquerque, New Mexico
Carlsbad Supply Company
Carlsbad, New Mexico
Gallup Brick & Tile Co.
P.O. Box 57
Gallup, New Mexico
Santa Fe Builders Supply Co.
P.O. Box 899
Santa Fe, New Mexico

OREGON
W. E. Mushet Company
646 N. Thompson Street
Portland, Oregon

SOUTH DAKOTA
Cracht Lumber Company
Rapid City, So. Dakota

TEXAS
Graves-Gulda Cement Company
P.O. Box 926
Amarillo, Texas
Steff-Buckner-Holt
600 West Paisano Drive
El Paso, Texas

WYOMING
Sheridan Press Brick & Tile Company
Sheridan, Wyoming
Lovell Clay Products Co.
Lovell, Wyoming
Casper Concrete Products Co.
Casper, Wyoming

THE CONTRACTOR'S BRICK

The Contractor and mason like HIFIRE BRICK because they lay fast and accurately. Their hard, even texture and uniform size mean straight cuts and true courses. HIFIRES arrive at destination sharp in appearance for a neat installation.

THE ENGINEER'S BRICK

Tough, rugged or unusual, the applications are all simple for the DFC HIFIRE. It meets rigid specifications.

THE OPERATOR'S BRICK

The DFC HIFIRE protects management's money by providing service beyond that attainable in years past...it also saves on maintenance costs.

See the improved HIFIRE for yourself
Write today for a sample and for specifications.

DFC

THE DENVER FIRE CLAY COMPANY

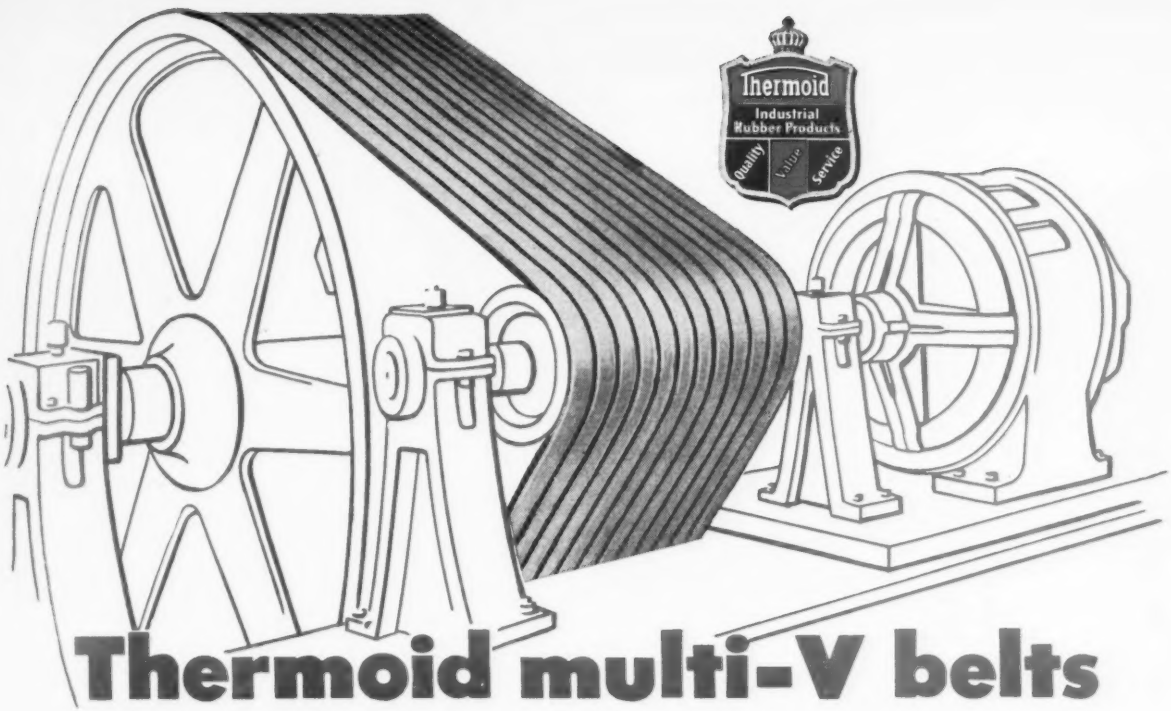
DFC

DENVER, COLORADO
2501 Blake St.
Phone: TA 0251

SALT LAKE CITY, UTAH
225 W. So. Temple
Phone: 4-5565

EL PASO, TEXAS
1309 Texas St.
Phone: 3-3497

ALBUQUERQUE, N. MEX.
121 7th St. N. W.
Phone: 3-1701



Thermoid multi-V belts

pre-stretched for non-slip performance

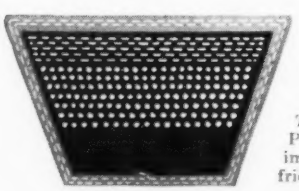
When you use Thermoid *Pre-stretched* Multi-V Belts, you can be sure of maximum power transmission, economical non-slip performance and extra long belt life.

Thermoid Multi-V Belts withstand moisture, abrasion and repeated shock loads.

They're built to take it—specially designed to resist internal friction and heat.

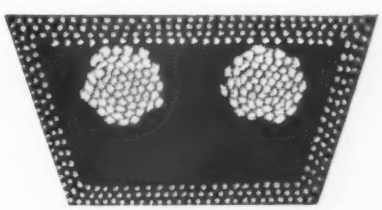
Your Thermoid Distributor can help you with power transmission problems, whether you use Multi-V, F.H.P. or Flat Transmission Belts.

It pays to specify Thermoid.



Thermoid D and E Sections
Grommet type construction assures lower permanent stretch, greater flexing ability and shock absorption.

Thermoid A, B and C Sections
Plied cord construction, latex impregnated to reduce internal friction and heat build up.

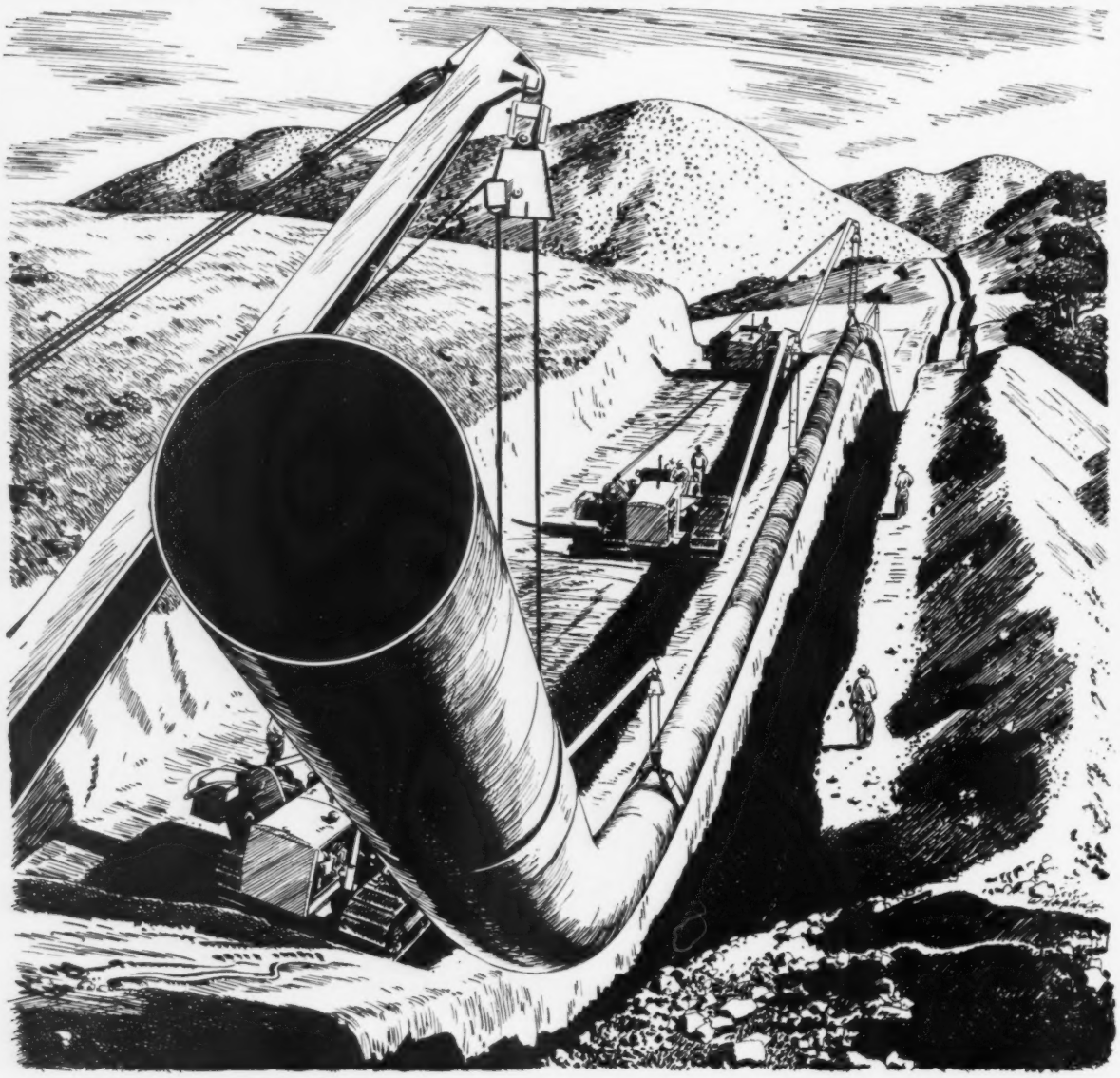


Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N.J. Nephi, Utah

Columbia-Geneva STEEL AT WORK IN THE WEST—"Super Inch", P. G. and E.'s 502-mile gas pipeline



100% OF THIS STEEL came from Columbia-Geneva!

It took 184,000 tons of steel plate to produce "Super Inch", the world's largest-diameter natural gas pipeline, which delivers 400 million cubic feet of gas every day to Northern California homes and industries. Columbia-Geneva Steel has the only Western mill capable of producing a single plate wide enough to be fabricated into the 34-inch pipe needed for the job.

For any job, big or small—Columbia-Geneva makes steel of many types. Of course, some of these products are in short supply. But we hope that when you need steel, you'll look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer **COLUMBIA-GENEVA STEEL**

Division United States Steel Corporation

USS

UNITED STATES STEEL

ASK FOR THIS DoALL CATALOG

. . . it's a source of supply directory for the finest products!

HERE is a helpful catalog for you—one of the most complete attractive, informative catalogs available on cutting tools, gages and a variety of industrial supplies. Twist drills or reamers, saw bands or gage blocks, hand files or grinding wheels —all are listed, and hundreds more. And it's current! "Up-to-date prices at your fingertips".

Back of this Catalog stands a factory-trained DoALL Cutting Tool Specialist, ready to assist you. Call him, take advantage of DoALL quality, personal service and prompt delivery.

Your Catalog is waiting for you. Write, or Call DoALL. Do it now. No obligation, of course.

San Francisco 3, California
CALL DoALL: GARFIELD 1-5784
DoALL San Francisco Company
952 Howard Street

Denver 2, Colorado
CALL DoALL: ALPINE 7444
DoALL Mountain States Company
1187 Stout Street

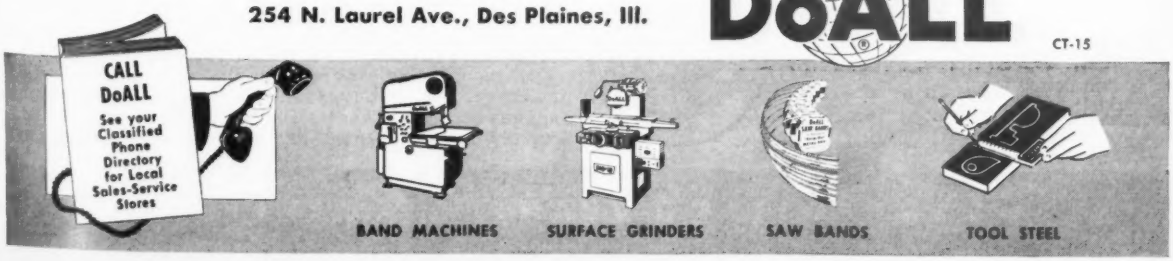
Los Angeles 21, California*
CALL DoALL: TRINITY 3871
DoALL Western Company
1316 S. Santa Fe

*San Diego Customer Service
1017 First St.
CALL DoALL: MAIN 8-2840

THE DoALL COMPANY
254 N. Laurel Ave., Des Plaines, Ill.

DoALL

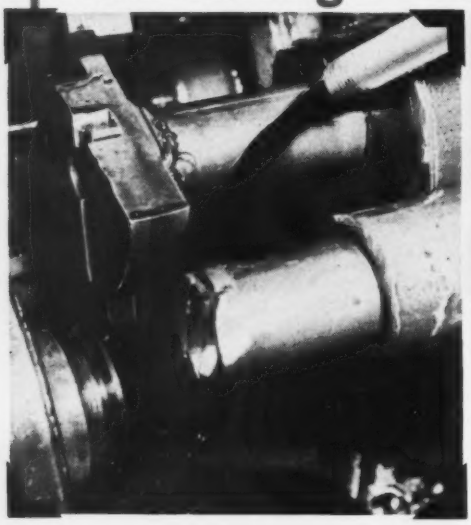
CT-15

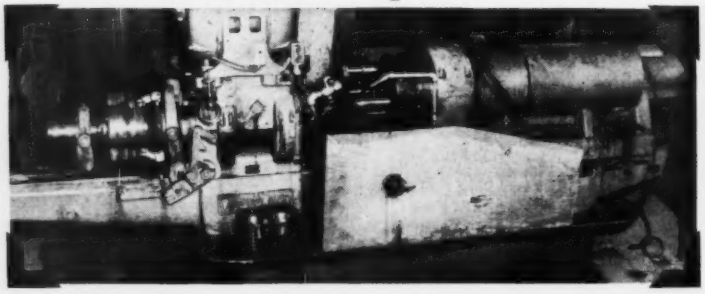


STANDARD ENGINEER'S REPORT

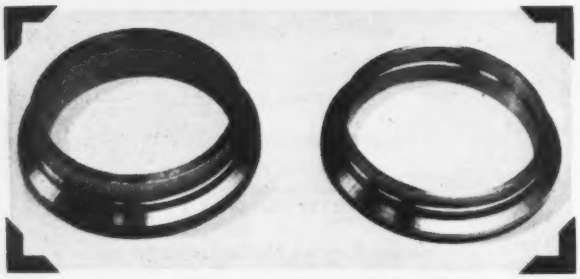
DATA	
LUBRICANT	Calol Cutting Oil 39-DA
UNIT	Automatic screw machines ½" to 5¼"
LUBRICATOR	Circulating
SERVICE	Machining spun cast stainless steel
FIRM	Speedway Engineering Co., Montebello, Calif.

Special cutting oil boosts tool life, improves finish!





WHEN CALOL CUTTING OIL 39-DA replaced a competitive oil on this 4½-inch Cleveland Automatic Screw Machine, it greatly increased tool life, improved the finish, and produced the close tolerances required in machining spun cast stainless steel. Tool life on this machine now averages 8 hours. The aircraft flange being worked at left, requires a 100 micro-inch finish and a final tolerance of 0.0015 inch. The Speedway Engineering Company has found Calol Cutting Oils completely uniform and able to handle efficiently any work in their shop.



THE HIGH FINISH OBTAINED with Calol Cutting Oil 39-DA is shown in this comparison photograph. The spun cast stainless steel flange (left) has been rough cut, while the other (right) has had final machining. This shop also uses Calol Cutting Oils on engine and turret lathes, milling machines, and drill presses.

FREE CATALOG: "How to Save Money on Equipment Operation," a handy booklet full of valuable information, is ready for you. Write or ask for your free copy today.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

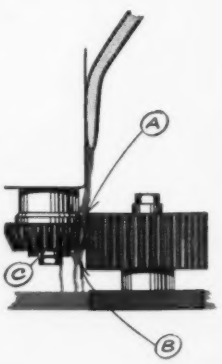
How to increase efficiency in all metal-cutting operations

Use the correct Calol Cutting Fluid for any operation from grinding to broaching. Recommendations for each are made from actual working results.

A. Have high cooling and lubricating qualities—minimize "built-up edge" and promote good finish.

B. Flush away cuttings readily.

C. Protect machine and work against rusting and corrosion.



STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

PRE-TESTED STAMINA FOR

HIGHER OUTPUT, LOWER MAINTENANCE

METALLOGRAPH PROVES THE SERVICE "EXTRAS" IN ATLAS "SUPER-LIFE" ROLLER CHAIN

Extra toughness for your heaviest shock loadings, extra wearability to slash your maintenance costs, and extra fatigue life to give you longer uninterrupted service! These extra values in every length of Atlas Roller Chain are pre-tested daily on the Atlas Metallograph, for proven performance year after year on your power transmission drives.

To give you smoother, trouble-free performance, the Metallograph stands guard over the stamina and toughness of every heat-treated part in Atlas Chain . . . checks the metallic properties that mean extra production at lower cost.

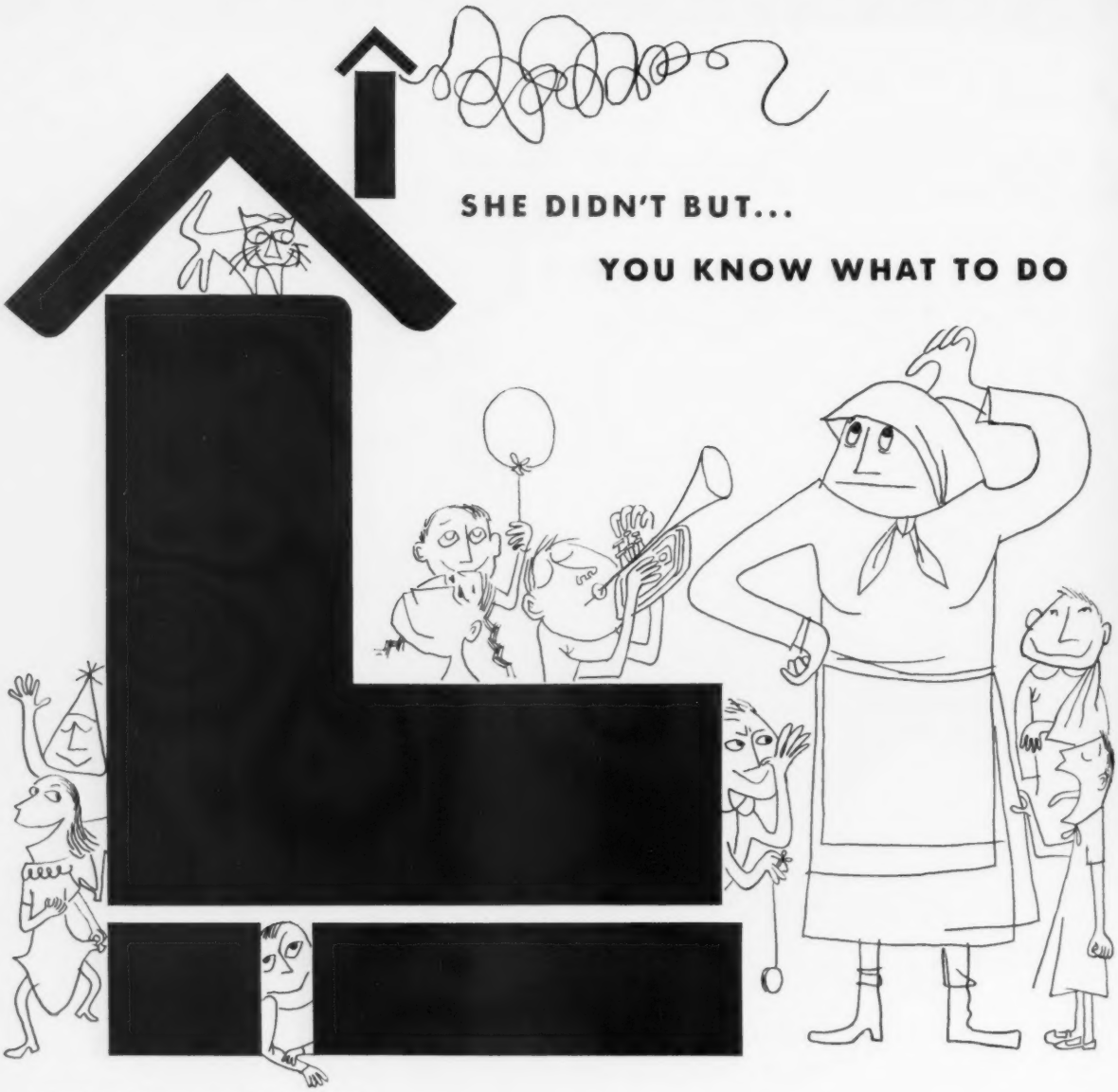
For full-rated speeds on all your machines, for longer wear and more economy, get the chain with the service "extras". . . . install Atlas Roller Chain on every drive. Send today for your copy of the fact-filled Atlas Catalog and Handbook.

See Your Local Atlas Distributor for Quick Deliveries and Experienced Service

ATLAS CHAIN & MANUFACTURING CO.
PHILADELPHIA 24, PENNA.

ATLAS

ATLAS ROLLER CHAIN



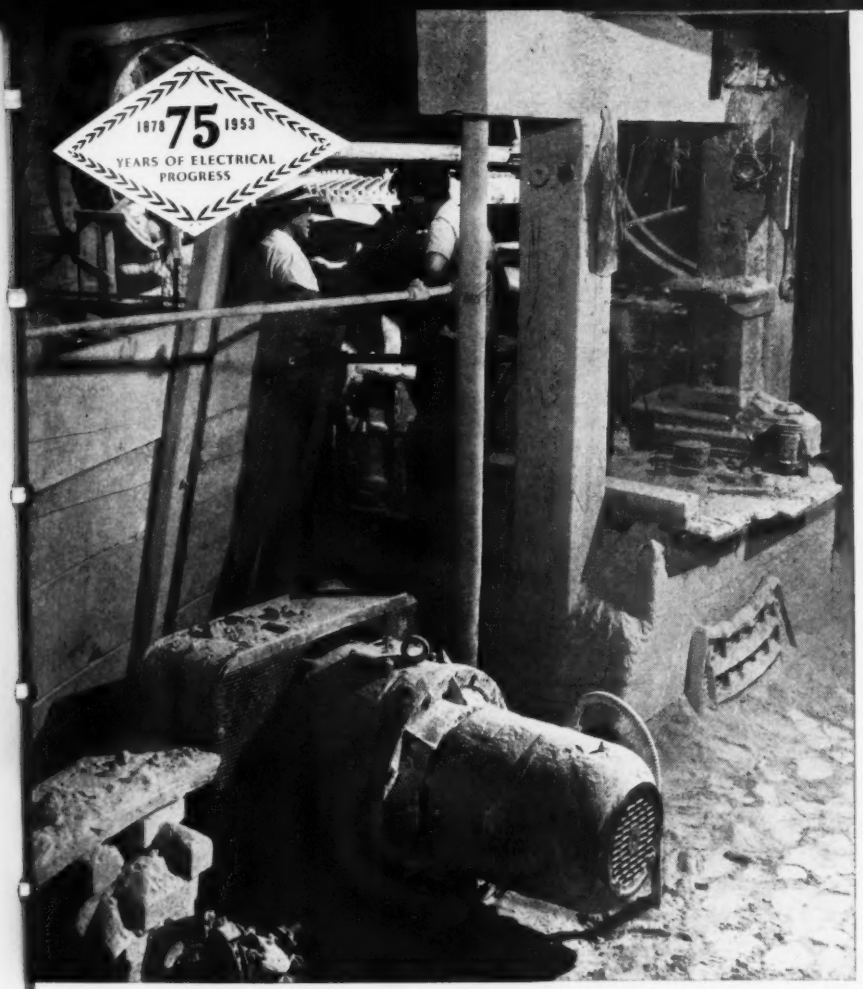
FOR
STEEL
ALUMINUM
MAGNESIUM

call Reliance every time... anytime

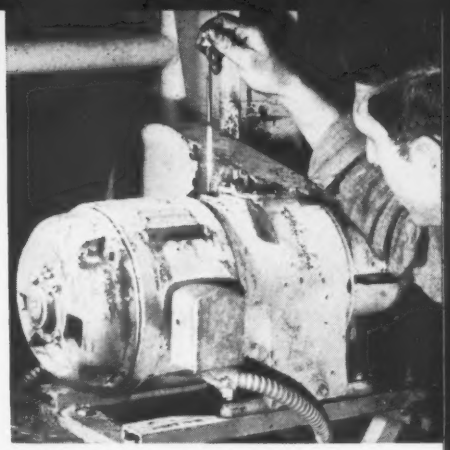
IF YOU HAVE as many problems as this old lady has children, you can stop being the whipping boy for everybody in the plant by starting to rely on Reliance for steel, aluminum and magnesium. Take a suggestion from the shoe—for bars, strip, structurals, plates, sheets and corrugated—just heel and toe yourself to the phone and waggle your tongue to call ADams 3-3193.

RELY ON RELIANCE STEEL COMPANY

2068 East 37th Street, Los Angeles 58, California



"WE HAVEN'T TOUCHED IT SINCE IT WAS INSTALLED on our pug mill 5 years ago," reports the Cannon Co., Sacramento, Cal., makers of tile, brick, and clay products.



CALIBRATED DIPSTICK provides a real time saver to routine maintenance. Just remove it, read it, replace it—and you know at a glance the level and condition of the oil in the reserve.

INSPECTION COVER enables you to inspect gears and bearings while motor is running—no need to stop the motor. Ease of inspecting G-E Pacific Gear-motor means less maintenance.

Choose G-E Pacific Gear-motors For Your Toughest Low-speed Jobs

Designed for long life and easy maintenance, a G-E Pacific Gear-motor will give you years of top performance on the most rugged low-speed applications.

There are many other advantages in specifying a G-E Pacific Gear-motor too:

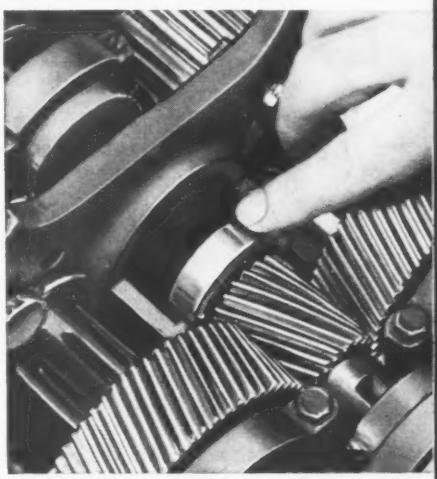
YOU GET THE GEAR-MOTOR YOU WANT regardless of power supply, type of enclosure needed, speed required, and type of mounting desired. Just ask for the gear-motor you want and a G-E Pacific Gear-motor is available. Standard ratings 1 to 50 hp.

YOU GET TRIPLE PROTECTION because Tri-Clad* motors are an integral part of every standard G-E Pacific Gear-motor. These are the same industry-famous motors which give you triple protection against physical damage, electrical breakdown, and operating wear and tear.

YOU GET PROMPT DELIVERY because G-E Pacific Gear-motors are built on the west coast and stocked in eight key western areas.

For more information write for Bulletin GEA-5787 to section 756-4, General Electric Co., Schenectady 5, N. Y.

*Reg. Trade-mark of General Electric Co.



DOUBLE PINION SUPPORT—ball bearings at both ends of all high-speed pinions prevents wobbling and excess vibration. Extra rigidity means longer motor life with less maintenance.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Who's wasting what? where?

Here's a competent and diligent worker doing what's needed to keep an important pipe line operating. How could that be a waste of high-priced maintenance time?

Maybe the waste was in buying valves and fittings that don't last. And in overlooking the fact that resulting upkeep, at today's maintenance rates especially, can quickly cancel out price tag "savings."

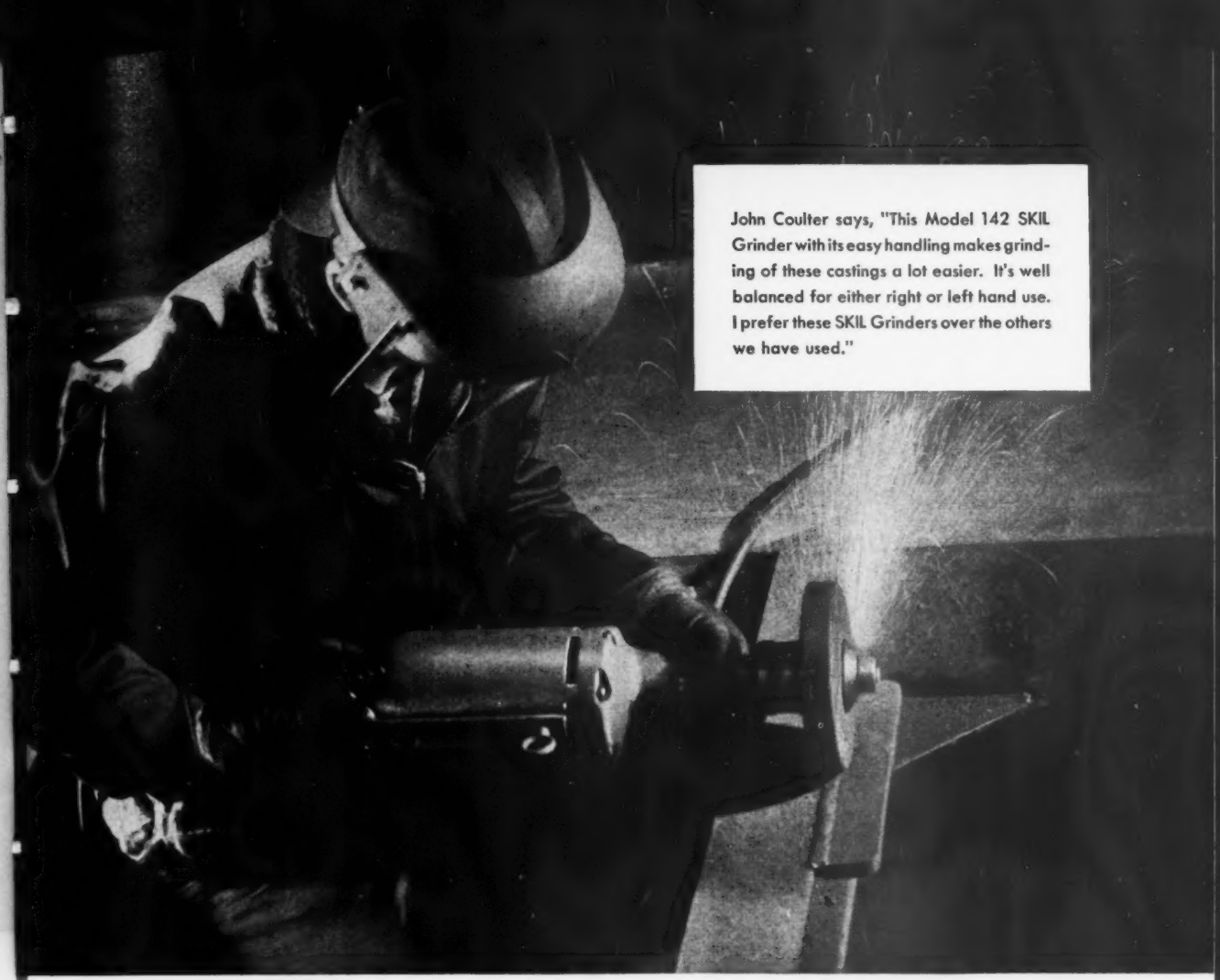
Waste of that kind can be avoided by thrifty buying. By insisting on better quality in piping equipment.

That's why buyers in so many plants today are looking for products that insure longer life, fewer repairs, less trouble in the line. And there's where Crane Quality shows up best. It's the dependable choice of thrifty buyers in every industry.

Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas.

CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING


John Coulter says, "This Model 142 SKIL Grinder with its easy handling makes grinding of these castings a lot easier. It's well balanced for either right or left hand use. I prefer these SKIL Grinders over the others we have used."

"3 year comparison tests prove SKIL best"

says **Mr. Lou Grundon,** president

Little Giant Crane & Shovel, Inc.

Des Moines, Iowa

Mr. Grundon knows tools and how to get the most out of them. He has orders for his Little Giant Cranes and Shovels from as far away as Serbia, Venezuela and Arabia.

"We've used 6 SKIL Grinders for 3 years in direct competition with other brands," Mr. Grundon says, "and as a result, we plan to stick to SKIL tools in the future.

"The performance of the SKIL tools has been excellent. And SKIL service has kept our production going at top speed. After trying several brands, we found SKIL the only make that gives us both performance and service."

SKIL
PORTABLE TOOLS

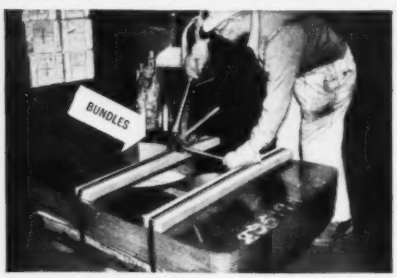
SKIL Products Are Made Only By SKIL Corporation
formerly SKILSAW, Inc.
5033 Elston Avenue, Chicago 30, Illinois
3601 Dundas Street West, Toronto 9, Ontario
34 SKIL Factory Branches

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Secures tractor parts for long-distance hauling . . . saves time and trouble for International Harvester

STRAPPING ON A TRACTOR. When International Harvester ships crawler tractors on open railroad flatcars, Acme Steel Strapping ties tool boxes, lubrication equipment and seat cushions in place for the journey.

SOLE SUPPORT for these IH Diesel engines is one Acme Steelstrap per engine. It secures the engine to a pallet for easy handling.

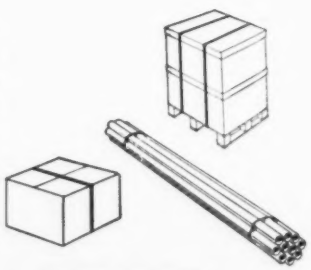


4,000 POUNDS of tractor dashboards are bundled together with Acme Steel Strapping for delivery from one International Harvester plant to another.

Whenever you receive anything secured with Acme Steel Strapping, you know that the shipper has taken care to get it to you safe. He has also beat the threat of damage-in-transit and has cut the cost of packing and shipping, too.

Acme Steel Strapping does all these things. It makes packing and loading easier and faster. It provides better protection during shipment, and helps insure S.A. (Safe Arrival).

Almost certainly, Acme Steel Strapping or Acme Steel Stitching Wire methods can help somewhere in *your* operation. If you have any kind of a shipping or materials-handling problem, we may have just the idea you need. Write Acme Steel Products Division, Dept. WI-53, ACME STEEL COMPANY, 4901 Pacific Blvd., Los Angeles 58, California.



ACME STEEL

STRAP IT . . . STITCH IT . . . SHIP IT . . . SAFELY!

keep your walkways slip-resistant with

tread-sure

the brush-applied abrasive floor coating

Tread-Sure is an abrasive-filled brush-coating, simple and inexpensive to apply on any size area. It produces a long-wearing slip-resistant surface on wood, concrete or steel. Tread-Sure maintains traction and resiliency and is comfortable to stand on, providing a safety footing. For exterior as well as interior use. Three non-glare colors . . . battleship grey, red, green.

SAFETY USES: steps and stair treads, aisles, walkways, ramps, gangplanks, grease racks, work benches, running boards, washrooms, showers, elevator floors, landings, machinery platforms, scale platforms, decks, hatch covers.

SAFETY USERS: industrial plants, food, beverage, milk, packing plants, hotels, hospitals, schools, railroads, utilities, service stations.

A. C. HORN COMPANY, INC.,
San Francisco 7, Calif.

WI-53

Please send me ☐ complete data on TREAD-SURE

HORN PRODUCT ☐ free copy of your 106-page Construction Data Handbook

NAME _____ TITLE _____

FIRM NAME _____

ADDRESS _____

CITY _____ STATE _____

A.C. HORN CO., Inc.

est. 1897

Manufacturers of materials for building maintenance and construction
LONG ISLAND CITY 1, N. Y. • Los Angeles • San Francisco • Houston
Chicago • Toronto SUBSIDIARY OF SUN CHEMICAL CORPORATION

Western Industry

EDITORIALS

Another case for the Westerner

WESTERN executives who utilize Eastern architects, engineers and contractors to draw up and carry out plans for their Western plants would have gotten an earfull had they attended the Institute on Industrial Plant design in Los Angeles in February. (Summaries of the papers presented at the Institute constitute a special section in this issue of *Western Industry*.)

Enough "horrible examples" of failure to take Western conditions into account were cited to have shaken the most obstinate Easterners.

Unfortunately such individuals did not attend the Institute, and very likely but few of them will read this editorial. Nevertheless, they will eventually have to learn, perhaps by the hard way, that it is far more economical to utilize the services of Western people and thus avoid many pitfalls.

It is incredible that Eastern people would equip plants in California for protection against snow; nevertheless this very thing has happened. While mistakes as silly as these are probably few and far between, there are frequent instances of costly failure to plan for weather conditions, soils, drainage and other local factors.

Because the West has grown up so rapidly, the news does not seem to have penetrated eastward that we have developed a corps of outstandingly competent architects, who design and build structures peculiarly suited and appropriate to Western conditions, and who should at the very least be in a consulting position for new plants in the West.

Help to the community

HOME OWNERS should be educated to accept industrial developments of types suited to their localities, the industrial council of the Urban Land Institute recommended after a four-day survey last month of San Mateo County, California. The logic used by President Sligh of the NAM in his recent speeches in the West should be constantly reiterated, that ten industrial jobs create at least twelve civilian service jobs, and that industrial payrolls generate a volume of business three and one-half times the extent of the payrolls themselves.

It works pretty well

THE MOST STRIKING fact about an outline we were privileged to hear presented recently by a regional representative of the National Labor Board regarding situations arising under the Taft-Hartley Act, seemed to be that the vast majority of complaints presented to the Board are settled without going through a formal hearing. This indicates that the law is working very well in the main, and that prospective revisions are not likely to endanger its usefulness.

State of mind

"HOUSEKEEPING is a state of mind," was the observation made to us the other day, well illustrated by a case example. In a certain factory no one could seem to get going on a housekeeping program, for one reason or another. Where to start, who should be responsible, and how far to go, seemed perplexing questions.

Then an outsider cut the Gordian knot. He was a new department head brought in from elsewhere, who knew nothing about the company situation, but whose standard was so much higher that he simply could not recognize anything less as being acceptable. In no time at all his department was so well cleaned up that the rest of the plant had to fall in line without any further ado.

According to Charles Lamb's "Dissertation on Roast Pig," the Chinese discovered the art of cooking by getting roast pig smeared on their fingers when a house with its contents burned down. Thereafter houses were burned on purpose until some bright soul realized that a smaller fire would do the job just as well.

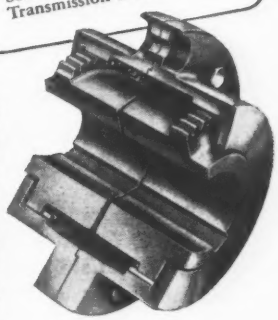
Moral: put the heat on the home talent; it may not be necessary to import a hot-shot from the outside.

THE Amerigear* FULLY CROWNED TOOTH DESIGN

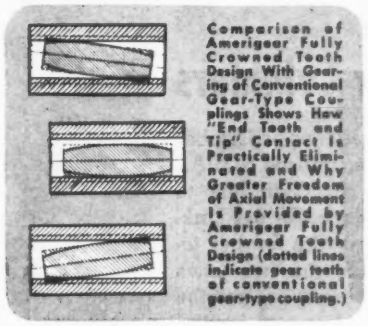
practically eliminates "End Tooth and Tip" contact
. . . gives greater freedom of axial movement

Crowned Tip Contacts Root of Internal Gear Tooth in Sleeve, Accurately Piloting Sleeve with a Ball and Socket Action.
Chamfered to Eliminate Interference with Sleeve Tooth Fillet and Allow Contact on True Flank of Gear Tooth.
Crowned Flank Carries All the Load and Provides for Correction of Lateral and Angular Misalignment Conditions.
A MAJOR IMPROVEMENT IN GEARING

Amerigear*
Fully Crowned Tooth Design Solves Wide Range of Power Transmission Problems.



Pat. & Pat. Pending



Comparison of Amerigear Fully Crowned Tooth Design With Gearing of Conventional Gear-Type Couplings Shows How "End Tooth and Tip" Contact Is Practically Eliminated and Why Greater Freedom of Axial Movement Is Provided by Amerigear Fully Crowned Tooth Design (dotted lines indicate gear teeth of conventional gear-type coupling.)

Copyright 1953

Oil Seals of Amerigear Couplings Are As Advanced in Design, Performance, and Effectiveness As Is the Amerigear Fully Crowned Tooth.

This major improvement in gearing—a fundamental improvement in gear tooth design results in these advantages: (1) Relief from extraneous stresses; (2) Crowned flanks providing for angular and lateral misalignment with back lash reduced to a minimum; (3) Torque load carried on flanks of teeth rather than on tooth edges; (4) Greater loads and higher speeds with corresponding longer life for coupling and equipment; (5) Close fit on crowned tips and flanks of teeth, inducing a ball and socket action between hub teeth and internal sleeve teeth, assure quiet and smooth performance. These advantages distinguish the Amerigear Couplings from common gear-type couplings. If your problem arises from excessive offset or angular misalignment, tight back lash requirement, space limitations, high speeds and loads, or any combination of these, the best solution is assured by use of the Amerigear Couplings with the Fully Crowned Teeth. Amerigear Engineers are available for consultation.

*Trade Mark Reg.

AMERICAN FLEXIBLE COUPLING COMPANY

Originator of the Amerigear Fully Crowned Tooth
Sales Offices in Principal Industrial Centers

ERIE, PA., U. S. A. AFFILIATE J. A. ZURN MFG. CO.

Exclusive Pacific Coast Sales Agent **ZURN WESTERN SERVICES, INC.**
1048 Folsom Street, San Francisco 3, California

American Flexible Coupling Co., Erie, Pa., U. S. A.

Please send me further information regarding AMERIGEAR COUPLINGS with the Fully Crowned Teeth and Catalog No. 501.

Name ..... *Title* .....
Company .....
Address .....
City ..... *State* .....
Please attach to your business letterhead.

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if so requested. Unsigned letters, however, will be disregarded.

Wide interest

Editor, *Western Industry:*

Not only do I find your January lead article on "The Facts You Need . . ." most interesting, but also your regular feature "The West on its Way."

F. G. GURLEY
President, The Atchison, Topeka and Santa Fe Railroad System, Chicago, Ill.

(Since Mr. Gurley wrote this letter, "The West On Its Way" has become a "Green Section" and occupies the last eight pages of each issue.)

* * *

We teach French, too

Editor, *Western Industry:*

During a recent visit at our plant, a group of French aviation and aircraft industry officials from the French Air Ministry requested data on application of the learning curve principle.

The series of four articles by Mr. Ghormley would be very useful to these gentlemen and we would appreciate receiving tearsheets of them.

J. W. ARMANTROUT
Lockheed Aircraft Corp., Burbank, Calif.

* * *

And help make cement

Editor, *Western Industry:*

Will you please send me tearsheets on the four parts of the article on "The Learning Curve" by Glen E. Ghormley.

J. L. GILLILAND
General Chemist, Ideal Cement Company, Denver, Colo.

* * *

No beefs on beef

Editor, *Western Industry:*

I have reviewed your article on meat packing contained in the January issue, and think you should be complimented on the preparation of your summary of the situation as it applies in the Western states.

HAROLD ABEL
Project Coordinator, Western Livestock Marketing Research Committee, U. S. Dept. of Agriculture, Denver, Colo.

Yes, we could do better

Editor, *Western Industry:*

The studies you include in your Review and Forecast issue are most interesting and well arranged. We know, however, that most of the subjects and the individuals interested in the subjects and topics of your publication are those of the heavy machinery industries. As a result, this limits us to some extent in our comment.

R. L. EDDY
Assistant to Vice President, American Can Co., San Francisco

* * *

But we're progressing

Editor, *Western Industry:*

I have just finished looking through your annual Review and Forecast issue. Let me congratulate you on another job well done. This number shows much careful research and thought and should be helpful to anyone concerned with economic developments in the West.

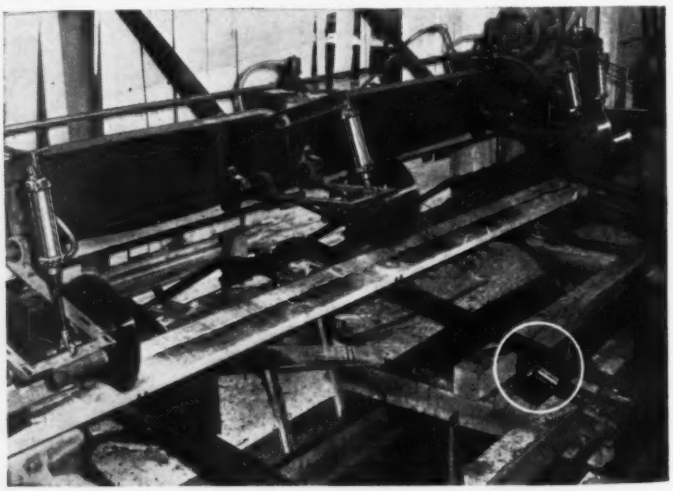
JOSEPH W. EHRENREICH
Economist, The Prudential Insurance Co. of America, Los Angeles

(While the Review and Forecast is full of economics, it is also intended to give a practical report on trends in operating methods and uses of new equipment and materials.)

Air Feed for TRIM SAWS..with NOPAK Air Cylinders

This 8-saw trimmer installation at Lumber Mills Corp., Ashland, Ore., utilizes NOPAK Model "E" cushioned Air Cylinders to "feed" the saws to the work. As the Link-Belt conveyor chains carry the lumber toward the trim saws, only the two saws which cut the boards to commercial lengths with minimum waste are lowered by the NOPAK Cylinders. The cylinders may be actuated by manually operated or automatic valves.

NOPAK Cylinder, located under conveyor chain, powers flipper arms which transfer boards from preceding conveyor chains at lower right.



Photograph, courtesy of Link-Belt Co., shows NOPAK Model "E" Cylinders used in conjunction with Link-Belt conveyor chains and pillow blocks.

This is one of many lumber mill installations employing NOPAK Cylinders to move saws into cutting position. (Others are shown in the NOPAK Application Manual.) It may suggest similar uses for NOPAK Cylinders and NOPAK Valves in your plant, or in machinery you build for resale.

For Data and Dimensions refer to Sweet's File for Product Designers, or write for Bulletin SW-1.

GALLAND-HENNING MFG. CO.
2749 SOUTH 31ST STREET • MILWAUKEE 46, WISCONSIN

NOPAK
VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE

Pacific Coast Representatives

The Willard Engineering Co., 1206 S. Maple St., Los Angeles 15, Calif.
Transmission Engineering Co., 53 Stevenson St., San Francisco 5, Calif.
J. M. O'Brien, 32 North Holman St., Portland 11, Oregon
E. C. Griffin Company, 524½ First Ave. South, Seattle 4, Washington

safety . . . that's their only business

two reliable safety valves protect you...

Since the two stage reduction regulator has two separate pressure reducing chambers, it is desirable to protect each of them with individual pressure relief valves. In the event of seat failure instant pressure relief will protect the operator and will give prompt warning that the regulator does not operate properly. Where the primary stage reduction chamber is not protected by an efficient and reliable safety relief valve, seat failure may go unnoticed, thus converting the two stage reduction regulator into a single stage regulator unbeknown to the operator.

it is important to have both reduction stages safety valve protected

Write for a revealing and instructive regulator booklet today — it's FREE, but valuable.

526

Made by National SINCE 1910 WELDING EQUIPMENT CO., San Francisco 5, California

Photo at ALAN-BARR ALUMINUM CO., INC., Palmyra, Pa.

cuts handling costs 20%
with Brainard Strapping Service

BEFORE salesman Bob Stuart of Harrisburg put *Brainard service* to work, these aluminum ingots were stored and shipped loose.

Then Bob, working with his customer's materials-handling engineer, helped develop a more efficient method. The ingots are now emptied directly from the furnace into special cradles on a conveyor belt. The cradles are designed so that unit loads, of 28 ingots each, can be strapped with Brainard heavy-duty strapping while still on the conveyor line. Then the unit loads are palletized and strapped, ready for fast handling by lift trucks.

Bob's ideas and experience paid off—labor costs are down 20%, less storage space is required, and customers are pleased with the palletized loads.

Ask your Brainard salesman *now* for recommendations — Brainard service can lower costs and boost efficiency in your materials-handling and shipping operations. Brainard offices located throughout the U. S. In Canada: Brainard Steel Canadian Division, Toronto.

COMPLETE STEEL STRAPPING SERVICE, LIGHT AND HEAVY-DUTY STRAPPING, TOOLS AND ACCESSORIES

Write for illustrated catalog. Brainard Steel Division, Sharon Steel Corporation, Dept. Q-5 717 Market Street, San Francisco, California.

Brainard
SHARONSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION

STEEL STRAPPING

CALENDAR OF MEETINGS

MAY 18-21—*California Assn. of Airport Executives,* Claremont Hotel, Berkeley. Contact Don Martin, Mgr., Oakland Airport.

MAY 23-24—*Executive Secretaries, Inc.* (national organization of key women in secretarial or administrative work). Hotel Claremont, Berkeley. Contact Anne Hawk, Ernst & Ernst, Central Bank Bldg., Oakland.

JUNE 13—*Western division of the Wire Association* at the Sir Francis Drake Hotel, San Francisco. Contact Richard E. Brown, executive secretary at 453 Main St., Stamford, Connecticut.

JUNE 21-JULY 3—*California Institute of Technology,* Pasadena, sixth annual conference on personnel administration and managerial development, four one-week discussions. Contact Industrial Relations Section, Cal. Tech.

JUNE 28-JULY 1—*Rocky Mountain Coal Mining Institute,* Hotel Colorado, Glenwood Springs, Colo.

JUNE 28-JULY 2—*American Society of Mechanical Engineers'* semi-annual meeting at Hotel Statler, Los Angeles. Contact O. B. Schier, II, ASME Meeting manager, 29, W. 39th St., New York, 18.

JULY 13-16—*Idaho Mining Association,* 50th anniversary meeting, Sun Valley. Contact Harry W. Marsh, secy., Boise, Idaho.

AUG. 2-9—*Western Conference on Apprenticeship,* Balboa Park, San Diego. Management contact Robt. C. Girard, California Metal Trades Assn., 1706 Broadway, Oakland.

AUG. 4-8—*International Association of Electrical Leagues,* San Francisco. Contact Victor W. Hartley, 601 W. Fifth St., Los Angeles 17.

AUG. 17-22—*Institute of Radio Engineers Manufacturers Assn.* and *West Coast Electronics,* regional conference and exhibit in San Francisco. Contact Mr. Heckert Parker, exhibit manager, 1980 Jefferson St., San Francisco.

AUG. 19-21—*Western Electronic Show & Convention* at Civic Auditorium, San Francisco. Contact Frank Haylock, 58 W. Poplar St., San Mateo, Calif.

SEPT. 9-11—*Pacific Coast Gas Association,* at the Fairmont Hotel in San Francisco. Contact Cliff Johnstone, secretary, 447 Sutter St., San Francisco.

SEPT. 10-12—*Rocky Mountain Industrial Exposition,* Univ. of Denver Arena. Contact Harold S. Craig, exec. secretary Rocky Mt. Management Club, 1031 - 15th St., Denver.

SEPT. 13-16—*American Institute of Chemical Engineers,* national convention at the Fairmont and Mark Hopkins Hotels in San Francisco. Contact George Gester, P. O. Box 1627, Richmond, Calif.

CONTINUED ON PAGE 26

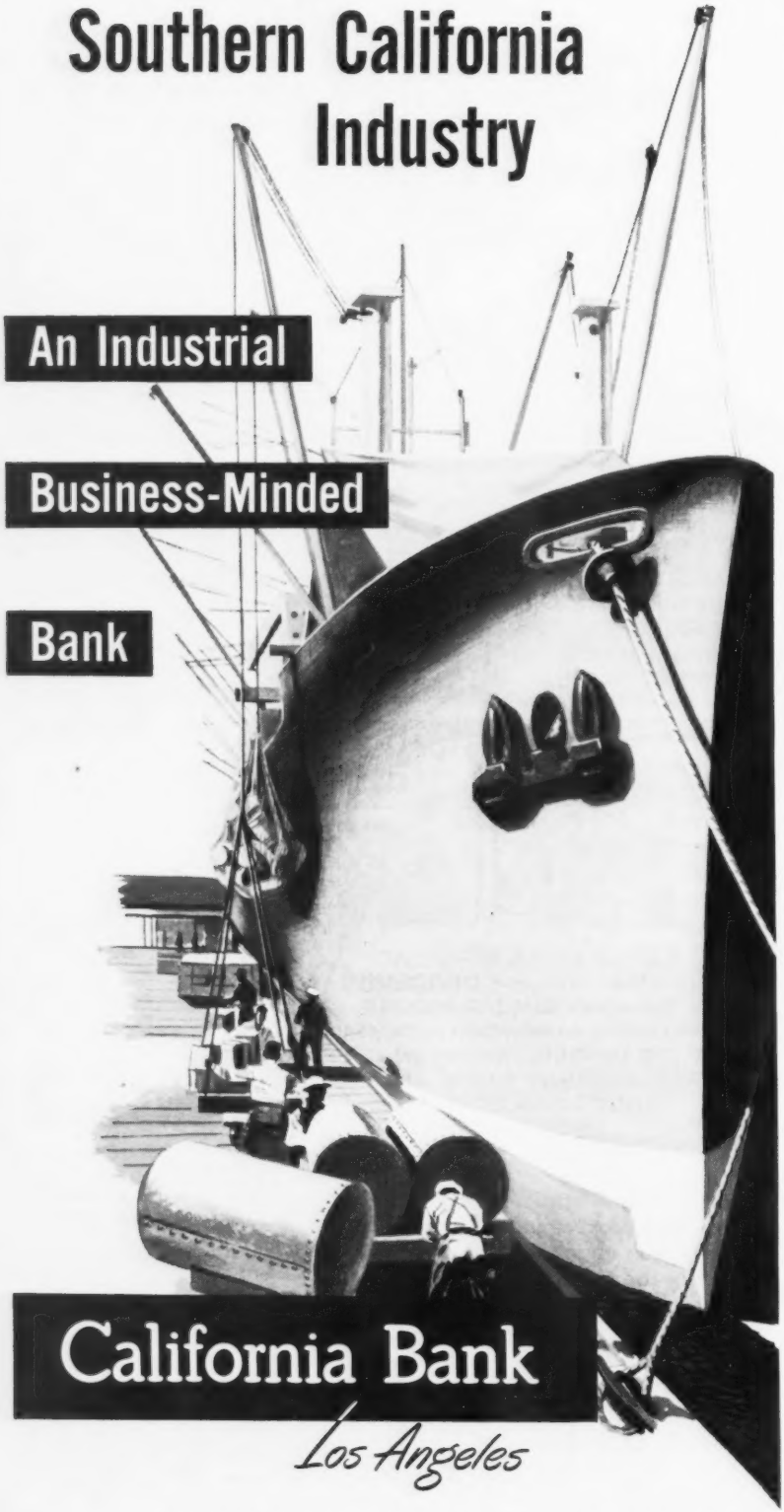
HIGH PRODUCTION AT LOW COST DEPENDS ON LUBRICATION AT THE RIGHT TIME.
THE BEST LUBRICANTS IN THE WORLD WON'T DO YOUR MACHINES A BIT OF GOOD IF THEY'RE NOT APPLIED AT THE RIGHT TIME, MR. MOORE.
WE'VE GOT TWO OILERS WHO MAKE THE ROUNDS EVERY DAY.
SURE, BUT THEY'RE ONLY HUMAN...TO INSURE PROPER LUBE TIMING YOU NEED AN AIR-TIGHT SYSTEM.
FIRST, WE LIST ALL EQUIPMENT, SHOWING WHERE, WHEN AND HOW TO LUBE EACH MACHINE. THEN WE PROVIDE PLASTIC CARDS TO PIN-POINT EACH MACHINE'S EXACT REQUIREMENTS.
Lubrication Schedule
BURKE TOOL CO.
NEXT WE PREPARE WORK SCHEDULES TO INSURE EVERY MACHINE GETTING THE RIGHT LUBE AT THE RIGHT TIME.
SEEMS KIND OF COMPLICATED TO ME.
A LITTLE EXTRA EFFORT AT THE START WILL PAY DIVIDENDS IN THE LONG RUN, MR. MOORE... YOU KNOW HOW MUCH A DAY'S DOWN-TIME MEANS IN REPLACEMENT PARTS AND LOST PRODUCTION.
BESIDES, WE WORK WITH YOUR MEN 'TIL THEY GET THE SYSTEM DOWN PAT.
11-42
WELL, IT SOUNDS BETTER THAN WHAT WE HAVE NOW, TOM... LET'S GO TO IT!

With General Petroleum's Lube Engineering program in your plant, you're assured of always getting the right combination for higher production at low cost . . . the Right lubricant in the Right place at the Right time. Why settle for anything less? Call your nearest G. P. office today.

GENERAL PETROLEUM CORPORATION

converting nature's gift for better living

Serving Southern California Industry



An Industrial

Business-Minded

Bank

California Bank

Los Angeles

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

CALENDAR OF MEETINGS

CONTINUED FROM PAGE 24

SEPT. 21-23—*American Mining Congress*, Metal and Nonmetallic Mineral Mining Convention, Olympic Hotel, Seattle. For hotel reservations contact Housing Committee, Seattle Hotel Association, 315 Seneca St., Seattle.

OCT. 16-17—*Automotive Electric Association*, national conference, San Francisco. Contact S. W. Potter, exec. secy., 802 Michigan Bldg., Detroit 26, Mich.

OCT. 18-20—*Pacific Northwest Trade Assn.* Fall conference on water resource development, Hotel Davenport, Spokane. Contact D. C. Knapp, executive secretary, 1217 Joseph Vance Bldg., Seattle.

OCT. 20-22—*Pacific Coast Management Conference*, at the Claremont Hotel, Berkeley, Calif. For further information contact California Personnel Management Assn., 2180 Milvia St., Berkeley 4.

OCT. 22-23—*American Ceramic Society*, Western regional conference at Palace Hotel, San Francisco. Contact James Hicks, chairman, at Kaiser Aluminum & Chemical Co., Rt. 6, Box 290, San Jose, Calif.

OCT. 27-30—*California Section, American Water-Works Association*, state convention, San Francisco. Contact John C. Luthin, secy.-treas., 1113 Laurent St., Santa Cruz, Calif.

NOV. 9-10—*California Fertilizer Association*, annual convention, business sessions at Golden Bough Theatre, Carmel, and Monterey Peninsula Country Club. Headquarters hotel for session, Hotel LaPlaya, Carmel, Calif. Contact secy.

DEC. 1-2—*Northwest Mining Assn.*, regional meeting in Spokane, Wash. Contact E. C. Stephens, Peyton Bldg., Spokane 4.

DEC. 31-JAN. 3, 1954—*California & Nevada Manufacturers of Carbonated Beverages*, regional meeting, San Francisco. Contact George Culley, exec. secy., 20 S. First St., Alhambra, Calif.

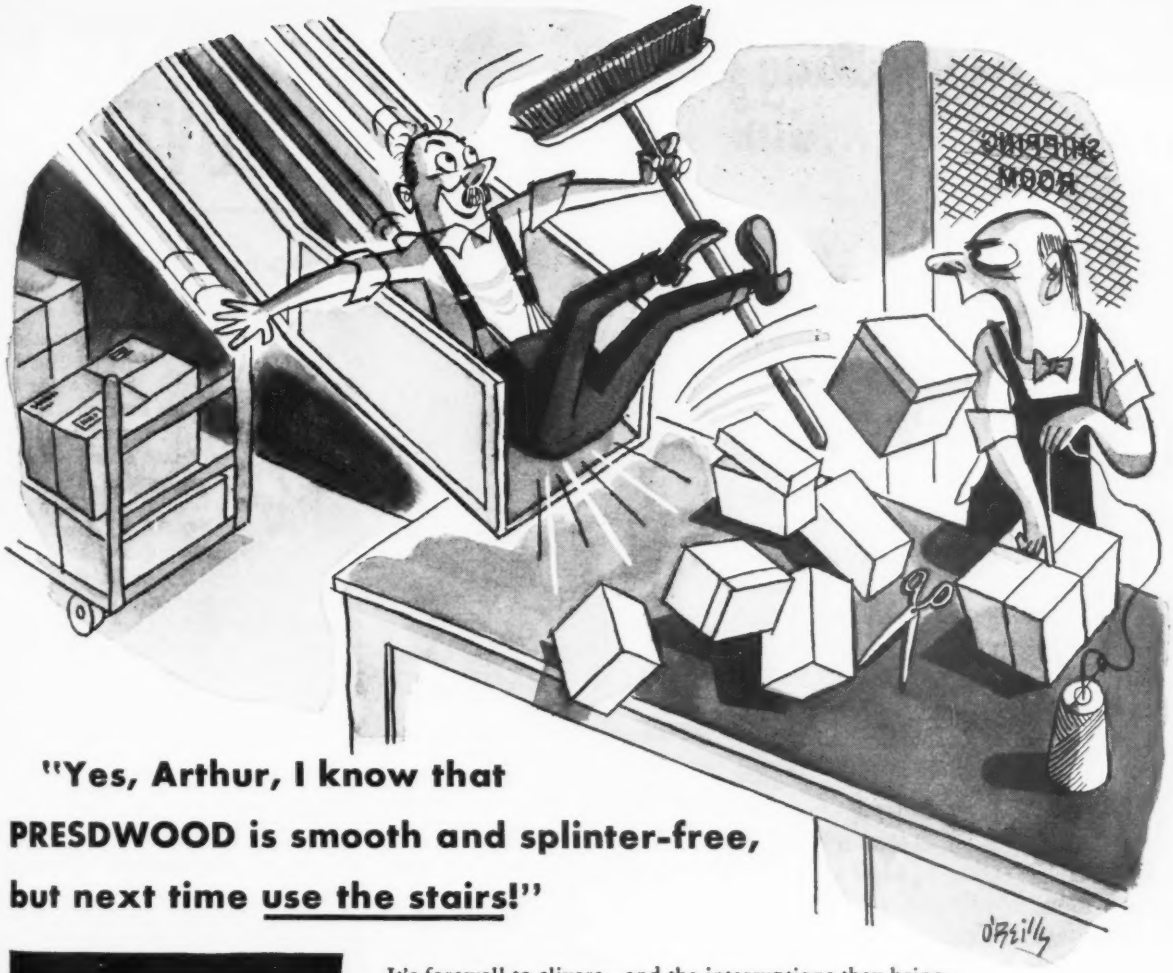
1954

JAN. 7-8—*Canners League of California*, annual fruit and vegetable sample cutting, Hotel Fairmont, San Francisco. Contact Canners League, 64 Pine St., San Francisco 11.

FEB. 2-5—*American Society of Sugar Beet Technologists*, eighth general meeting, Shirley Savoy Hotel, Denver. Contact Box 531, Fort Collins, Colo.

FEB. 9-13—*Western States Meat Packers Association*, regional meeting, San Francisco. Contact E. F. Forbes, president and general mgr., 604 Mission St., San Francisco.

FEB. 23-28—*American Concrete Pipe Association*, national convention, San Francisco. Contact Howard Peckworth, managing director, 228 N. LaSalle St., Chicago 1, Ill.



"Yes, Arthur, I know that PRESDWOOD is smooth and splinter-free, but next time use the stairs!"

all through the plant...

MASONITE PRESDWOOD

solves maintenance problems!

It's farewell to slivers—and the interruptions they bring—when Masonite Presdwood® comes into your plant. It has no knots or grain, so it won't split, splinter or crack—an ideal surface for chutes and slides, for table and bench tops. Takes a lot of heavy punishment, too.

This dense, all-wood hardboard is easy to cut and fit with regular carpenter's tools. You can even bend it to form permanent curves. And its modest cost stretches your maintenance budget.

See your local building materials dealer. He'll help you select from the 33 types and thicknesses of Masonite Presdwood. And send coupon for brochure with lots more money-saving ideas. It's free.

WESTERN HARDBOARDS FOR WESTERN INDUSTRY

MASONITE® CORPORATION
Dept. WI-5, 111 Sutter Street, San Francisco 4, Cal.

Please send me your brochure on "How to Improve Factory Methods with Masonite Presdwood."

Name.....

Firm.....

Address.....

City.....*Zone*.....

County.....*State*.....

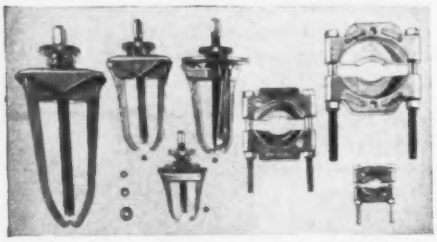
"Masonite" signifies that Masonite Corporation is the source of the product

handle ALL pulling jobs
swiftly . . . easily . . . with
Snap-on*
INTERCHANGEABLE
PULLER TOOLS

NO NEED to invest in an extensive, costly assortment of puller tools! Snap-on pullers and parts are *engineered* for maximum interchangeability. They handle the widest range of operations with greatest speed and safety with fewest units, lowest cost. The Industrial Puller Set illustrated, CG-608, will handle all puller operations encountered in most shops—size capacity up to 14" diameter with power up to 20 tons.

Write for Snap-on Industrial Catalog and General Catalog of 4000 hand and bench tools. A nearby Snap-on factory warehouse is ready to give you immediate service on all your tool requirements.

SNAP-ON TOOLS CORPORATION
8032-E 28th Ave. • Kenosha, Wisconsin



CG-608 Industrial Puller Set—Includes 4 screw-type pullers—small, medium (2-jaw and 3-jaw) and large. Size capacity up to 14", power to 20 tons. 3 Bearing Separators, up to 5¾" O.D. capacity, and Screw Point Protection Set.

CG-270H
8½" Jaw
Capacity
2-Jaw, Slide
Hammer Gear
Puller

Snap-on Tools
THE CHOICE OF BETTER MECHANICS

*Snap-on is the trademark of Snap-on Tools Corporation

THIS MONTH'S COVER

GOOD PLANT DESIGN makes money for you

AS A SPECIAL section in this issue of *Western Industry* is devoted to industrial plant design, the front cover picture relates to the same theme.

Design includes a far wider range than merely an impressive facade, adequate foundation, wall and roof and convenient columns. It also relates to utilities, auxiliary structures and many more essential details, and this special section is the first presentation of its kind in the West of the outstanding considerations involved in building a new plant.

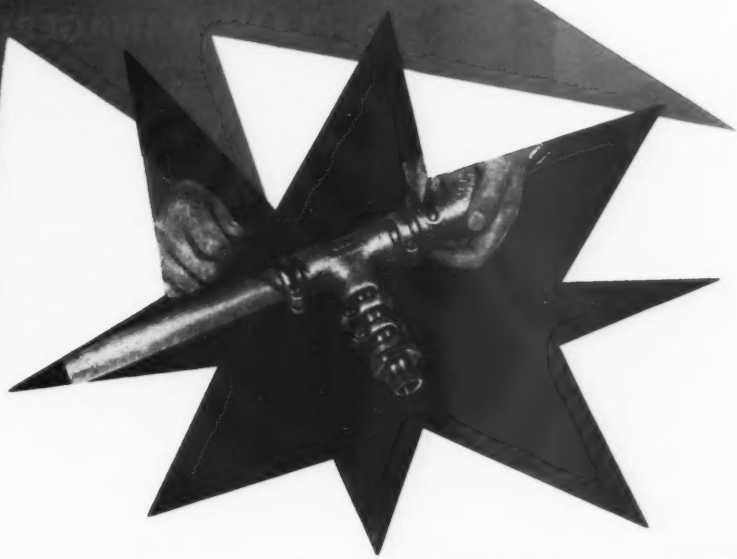
The cover picture shows the "tank farm" at Rinshed-Mason Company's Pacific Coast plant at Anaheim, California. Their product is industrial paint and their big specialty automobile finishes, for which there is a big market among the eight automobile assembly plants in Southern California and the three in the San Francisco Bay Region.

BELOW IS a warehouse scene at Union Hardware Company in Los Angeles which shows the importance of proper column spacing, overhead clearance and lighting. Wall to right is made of pre-cast concrete panels that can be unbolted and bolted to a new wall, in case of expansion. Architects for both Rinshed-Mason and Union Hardware were Albert C. Mason and Associates.

lionhill

we quote...

"WOW!"



Quikupl

The time-saving, service-tested, stainless steel fitting for joining pipe or tube without threading, flaring or welding, has been getting the raves from cost conscious plant managers.

HERE'S THE WAY THEY TALK:

"Quikupl put us in production months ahead of schedule . . . and sliced 40-50% from our estimated installation costs."

PRECISION FILM LABS.

"Quikupl saved us 37% on installation and eliminated the headaches that go with threading or welding stainless steel."

NEW YORK DAILY NEWS

Quikupl may be your answer to rising labor costs. Write for the facts and find out.

Get the full story of this amazing stainless steel fitting which permits quick assembly and disassembly of stainless pipes or tubing without threading, flaring or welding.

Write for Bulletin Q100 today.

COOPER ALLOY
THE COOPER ALLOY FOUNDRY CO.
2802 TENTH ST • BERKELEY 2, CALIF.

Name:_____ Title:_____

Company:_____

Address:_____

City:_____ Zone:_____ State:_____

MOTO-TRUC

Designed for...

Pallet type "Walkie" truck 4000 to 6000 lb. capacity.

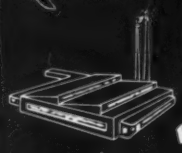
Platform "Walkie" type 4000 to 10,000 lb. capacity.

✓PURCHASING DEPT.

Costs less . . . fits into budgets . . . economical.

✓ENGINEERS . . .

Rugged, all welded construction . . . constant traction . . . stablized 4 point load support on Hi-Lift . . .



PLANT MANAGERS . . .

Small . . . compact . . . *minimum* operation and storage area . . .

✓OPERATORS . . .

Simplified operation through "Roller Grip" controls . . . *anyone* can operate the truck with very limited instruction . . .

✓MAINTENANCE MEN . . .

Especially designed for quick servicing . . . all parts easy to get to . . .

5th NATIONAL MATERIALS HANDLING EXPOSITION

MAY 18-22, 1953
PHILADELPHIA
COME IN AND SEE OUR COMPLETE LINE . . .
BOOTH No. 1001 & 902

Hi lift "Walkie" type 3000 to 4000 lb. capacity.

Model G. A. Tractor.

Regardless of individual titles, it will pay you to get *ALL* the facts on MOTO-TRUC . . . and there's a MOTO-TRUC for every purpose.

SEND FOR BULLETIN NO. 51

MOTO-TRUC Designers FOR THE INDUSTRY PATENTED

The MOTO-TRUC Co.

Representatives in Principal Cities

1963 E. 59th St. • Cleveland 3, Ohio
Pallet . . . Platform . . . Hi-Lift Trucks
LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"

THE MAGNIFICENT

White Mustang Engine

CAN PUT YOU "MONEY AHEAD!"

TODAY there's no need to stick with tired hauling equipment that can't "cut the mustard" anymore. Truck operators in many industries are replacing worn engines with White's magnificent Mustang...and reporting more than gallon-per-mile savings along with a completely new standard of performance. It will pay you to get the facts as they apply to your particular business; just call your local White Representative.

P. S. Profitable Mustang replacement is available for other make trucks as well as White. Investigate.

White

THE WHITE MOTOR COMPANY
CLEVELAND 1, OHIO
Factory Branches, Distributors & Dealers Everywhere

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

Meeting Emergency Demands for Steel

Here are records of six emergencies faced—and met—by Ryerson Steel Service:

Shutdown Averted

4:30 p.m.—1000 lbs. bar stock urgently needed to avert shutdown of night operations. Order processed by office at 4:35; goes to warehouse at 4:41. Steel leaves Ryerson plant at 5:30; arrives at customer's plant (7 miles away) at 6:05 p.m.

Shipped in 1½ hours

10:15 a.m.—two plates needed immediately. With customer still on phone, Service Department alerted. Steel sheared to size and on its way by 11:45 a.m. same morning.

Night Shift Comes Through

3:00 p.m.—order phoned in for 20,000 lbs. of sheet steel. Needed (90 miles away) at 8:00 a.m. next day. Working through the night, Ryerson warehouse crew cuts the steel—loads it on truck that leaves at 6:00 in the morning. Shipment arrives at customer's plant on time.

Breakdown Saturday—Production Monday

Saturday—11:45 a.m. Emergency call. 8″ alloy steel round needed to repair breakdown of main shaft. Cut during lunch hour, the 1700-lb. bar is immediately trucked to airport; loaded on cargo plane. Customer meets plane on arrival in distant city. Repairs are completed Sunday; full production resumed on Monday.

Delivery 600 Miles Away—7 Hours

3:00 p.m.—200 lbs. of flat bars, in cut lengths, needed in a hurry 600 miles away. Just 2½ hours after receipt of order, plane takes off with steel from Ryerson. At 10:51 p.m. same day, customer has his steel.

Still Hot When Delivered

11:15 a.m.—Manufacturer reports breakdown; needs 2″ x 72″ x 10′ plate at once—must be flame cut. Plate delivered at 2:15 p.m., still hot.

Of course, out of thousands of orders, we can fill only relatively few at such breakneck speed. However, in emergencies, the world's largest steel service organization, with 15 interconnected plants, is your best source for steel. And, despite some shortages, you can also count on Ryerson for most every day-to-day steel requirement. So when you need steel—carbon, alloy, stainless—call your nearby Ryerson plant.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, MACHINERY & TOOLS, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC.

LOS ANGELES PLANT: Box 3817, Los Angeles 54. Plant: 4310 E. Bandini Blvd. Phone: ANgelus 2-6141. From San Diego (No toll) Phone ZEnith 6660.
SAN FRANCISCO PLANT: Box 188, Emeryville. Plant: 65th & Hollis Sts. Phones: OLympic 3-2933, ENterprise 10176.
SEATTLE STEEL PLANT: Box 3268, Seattle 14, Wash. Plant: 1200 - 4th Ave., South. Phone: Seneca 2300.
SPOKANE (INLAND EMPIRE STEEL) PLANT: Box 2158, Spokane 10, Wash. Plant: North 207 Freya St., Spokane, Wash. Phone: Keystone 9311.

Western Industry

MAY 1953

CORRECTING PUMP TROUBLES—

Failure to deliver water, reduced capacity and pressure, loss of prime, over load on motor, vibration

By

B. A. TUCKER

General Sales Manager
Peerless Pump Division
Food Machinery & Chemical Corp.
Los Angeles

THE ULTIMATE success of a pump depends upon proper application and installation. The pump installed for a service for which it was not designed will probably never be satisfactory.

Likewise, a pump not properly installed probably will never give trouble-free service. Therefore, for the purpose of this article, we will assume that the pumps have been properly selected and installed correctly.

First, let us consider a centrifugal pump. What troubles or difficulties should we look for?

1. FAILURE TO DELIVER WATER

This may be caused by:

(a) The pump not being up to speed. If this is the difficulty, it can be easily determined by checking the speed with a tachometer or other rpm. counter. Should this be the difficulty,

Correct and incorrect methods of connecting suctionlines on centrifugal pumps

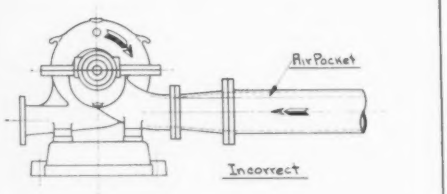
FIG. 1 shows an air pocket formed by using concentric increasers on the pump suction nozzle.

FIG. 2 represents a common error made in suction piping to a centrifugal pump, by placing piping over an embankment of a reservoir, a levee, or other obstruction, forming an air pocket. With the forming of an air pocket in the suction line air will come through in slugs, reducing the capacity of the pump, or if the slug is sufficiently large, may cause the pump to lose its water.

FIG. 3 indicates the path of water where a side connection is made to the suction nozzle of the pump. The water follows the largest radius of the elbow and tends to deliver more water on one side of the impeller than the other, causing thrust. With a condition like this, with a side elbow connected directly against the suction nozzle there will always be thrust trouble, undue heating of the thrust bearing and possibly a burned out bearing.

FIG. 4 indicates an air pocket formed when the pump is placed in the horizontal center line of a suction header which is larger than the suction nozzle of the pump.

SUCTION LINES must be kept absolutely free from air leaks. Air cuts down the capacity of the pump, and if sufficient, will cause the pump to lose its prime. 1½% air by volume will cut the capacity 10%, and 3½% will disprime the pump.



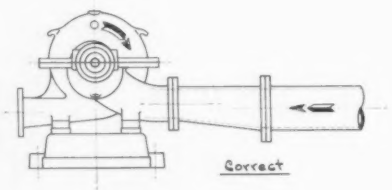
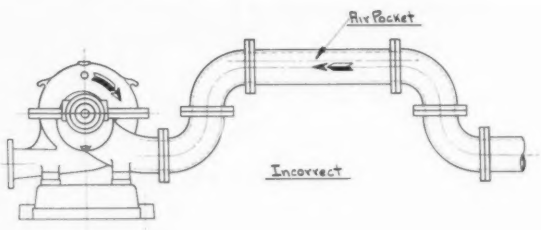


Fig No 1.



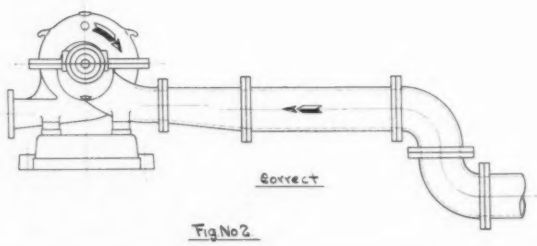
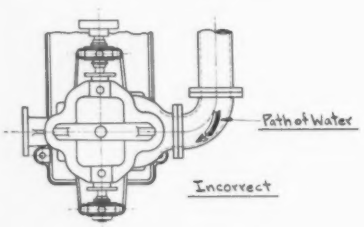


Fig No 2.



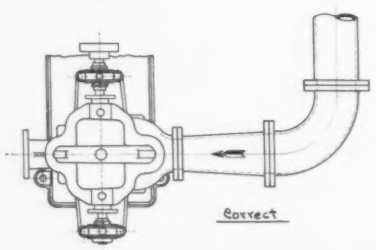
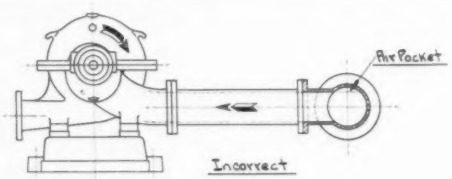
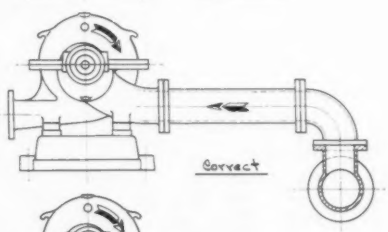


Fig No 3.





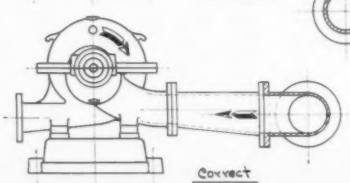


Fig No 4.

it is then the fault of the driver. If electric drive, this may be caused by low voltage or other electrical difficulty and a motor man should be brought in for this service. If it is engine drive, it may be caused by improper carburetion, timing or other causes, and if that is true, the engine man should be called.

(b) The pump might not be primed. If that is the difficulty, the pump should be stopped before damage is done to the packing and shaft sleeves. While the pump is idle, it should be completely filled with liquid—including the suction line. This may be accomplished with a vacuum pump or by bringing the liquid in from an outside source. When all suction lines and the pump case are completely filled and all air expelled, then the pump should be started.

(c) The actual discharge head may be more than that for which the pump was designed. This can be accurately determined by the use of pressure gauges, and if that is the difficulty, then the pump should be changed, or the discharge head conditions modified in accordance with that for which the pump was designed.

(d) The suction may be excessive. This can be determined by the use of a vacuum gauge, and if that is the cause, either the pumps should be changed or the suction conditions corrected.

(e) The pump may be operating in the wrong direction. This can be checked because each pump has an arrow cast on the pump case showing the proper direction of rotation. Direction of rotation can be reversed in electric drive jobs by changing the leads on the motor.

2. REDUCED CAPACITY

This may be caused by:

(a) Speed too low.

(b) Air leaks in the suction line or the stuffing boxes.

(c) Total head higher than that which the pump was designed for.

(d) Excessive suction lift.

(e) Impeller clogged.

(f) Insufficient positive head on the suction side, if it is pumping hot liquids.

(g) Mechanical trouble such as worn wearing rings, damaged impeller or defective packing.

(h) Suction line admitting air, either by not being submerged or by air coming in through the foot valve.

If either of the causes, such as (a) through (d), the same procedure should be followed as given for failure to deliver water.

If (e) is the cause, impeller clogged, then the pump case should be opened and the clogging material removed from the impeller. If it is an end-suction pump, it can usually be accomplished by the removal of the suction; if it is a split-case pump, it can usually be accomplished by the removal of the upper half of the case. It may be necessary to take the suction lines out for either design before all matter can be eliminated.

If the difficulty is (f) insufficient NPSH, then the pump must be lowered or the liquid head built up higher in the suction side.

If the difficulty is (g) wearing rings should be replaced; if the impeller is damaged it should be removed and repaired; if the difficulty is packing, the pump should be repacked. Sometimes shaft sleeves will have to be replaced when the packing is replaced.

If the difficulty is (h) and the suction line is not submerged, then, of course that can be corrected by proper submergence, or by building a liquid head on the suction side.

3. REDUCED PRESSURE

This may be caused by:

(a) Speed of the pump too slow.

(b) Air in the water.

(c) Mechanical difficulties, such as worn wearing rings, damage to impeller and insufficient or defective packing. Correction of all of these difficulties could be made by using the same procedures as for items No. 1 and No. 2.

MORE ON PUMPS

THIS ARTICLE by Mr. Tucker, on maintenance of centrifugal pumps, will be followed in the June issue by a second article from the same author along the same line, except that it will deal with vertical turbine pumps.

4. PUMP LOSES PRIME AFTER STARTING

This difficulty could be caused by:

(a) Water seal plugged. This would be indicated by air being in the water, and if found to be the difficulty, the water line to the water seal should be disconnected and thoroughly cleaned.

(b) Suction line could be leaking air. The same procedure for (a) should be followed in this respect.

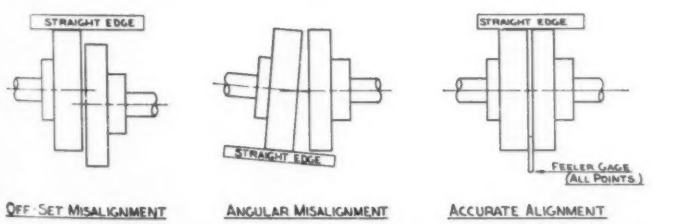
(c) Excessive suction lift. This can be determined by the use of a vacuum gauge, and if found to be the difficulty, then we would have to follow the same procedure as called for in item (d) under paragraph one above. That is, we should have greater water pressure on the suction side or the pump should be lowered to minimize the lift.

(d) Air or gas in water ($3\frac{1}{2}\%$ air by volume will disprime a centrifugal pump). To correct this difficulty, the air or gas will have to be eliminated by the use of some of the above procedures

5. OVERLOAD ON MOTOR OR DRIVER

In case of electric motor drive, this can be easily determined by watt hour meter readings. In the case of engine drive, it can be discovered by the engine heating or by the engine laboring, thus indicating it is carrying an excessive load. The excessive load may be caused by:

(a) Speed higher than that rated for the pump. If electric drive, this



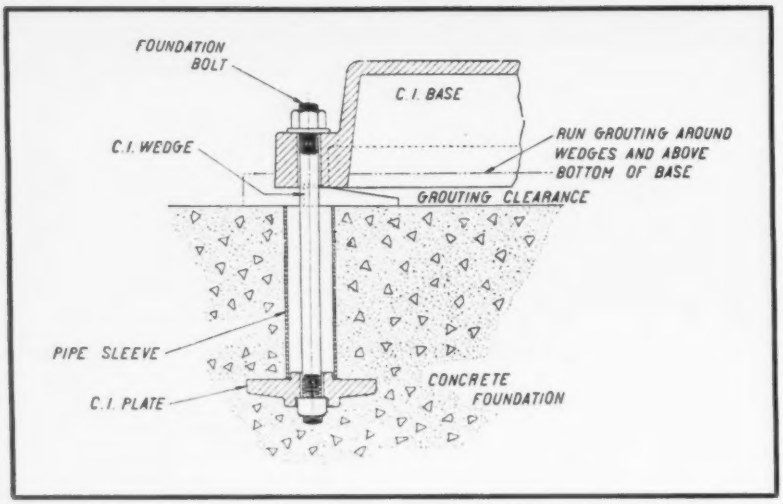
OFF-SET MISALIGNMENT
℄ OF SHAFTS PARALLEL BUT NOT IN LINE

ANGULAR MISALIGNMENT
℄ OF SHAFTS INTERSECTING

ACCURATE ALIGNMENT
℄ OF SHAFTS IN LINE - STRAIGHT EDGE EXACTLY LEVEL ACROSS COUPLING FLANGES AT ALL POINTS - FACES OF COUPLINGS EXACTLY SPACED AND PARALLEL AT ALL POINTS

Coupling alignment

PLACE THE PUMP on wedges resting on the foundation, adjust them until straight edge across rims of coupling flanges at four points 90° apart lies exactly square, and until distance between the coupling flanges as measured by feeler gauges placed 90° apart is equal.



Good foundation essential

TOP OF foundation should be left approximately one inch low to allow for grouting. The top foundation should be roughened and cleaned before placing unit in place. Preferable to install foundation bolts in pipe sleeve type holders. After aligning piping, thoroughly puddle grouting under baseplate and allow to set for at least 48 hours.

may be caused by excessive voltage or wrong motor application, either of which would be easily corrected by changing the motor or by having the power company reduce voltage. If it is caused by excessive engine speed, then it should be reduced by throttle or whatever method seems most practical.

(b) Total head lower than the rating, which would cause the pump to be delivering too much water. Under this circumstance, the total pumping head should be increased, or the pump changed to meet the new conditions.

(c) The liquid being pumped is of different specific gravity and/or viscosity than that for which the pump was built. If the pump is required to continue in this service, then the only way to properly cure this difficulty is to change the diameter of the impeller.

(d) If the overload is caused by mechanical trouble, such as too close a fit in wearing rings, packing too tight, or misalignment between motor and pump, the difficulty will have to be corrected by the removal of the rotating element and extra clearance machined in the wearing rings, or by changing the packing, or by realigning the pump and motor. These are comparatively simple operations, and any operator will have no difficulty accomplishing them.

6. VIBRATION

When the pump vibrates or has excessive noise in operation, the operator will probably find either of these causes most difficult to locate.

Vibration may be caused by:

(a) Misalignment. That should be checked to be sure that the pump and motor are in proper alignment.

(b) Insufficient or insecure foundation. This can be corrected only by removing the pump and building an adequate foundation and properly grouting in the pump.

(c) The impeller may be partially clogged, which would cause an unbalanced condition and thus vibration. If this happens, the piping and pump case will have to be removed in order to expose the clogged portion of the impeller and the obstruction removed.

(d) Mechanical defects such as bent shaft, worn bearings, or dragging shaft sleeves. If these difficulties occur, the shaft should be replaced, the worn bearings replaced, and then properly realigned.

(e) The suction pipe or discharge pipe may be either resting upon, or hanging upon the pump case, thus throwing a bind in the pump shaft. If this occurs, then the piping will have to be properly supported outside and away from the pump case. This is a difficulty that sometimes occurs and is the last thing to be thought of by the pump operator.

(f) The pump may be "vapor bound." This can be caused by the pump not being fully primed, and if that is the case, we should follow the same procedure as is outlined under item (b), paragraph one, enumerated above.

7. LUBRICATION

There are generally two types of lubrication used in pumping equipment, i.e., oil lubrication for sleeve bearings, and grease lubrication for ball bearings. Bearings of the ring oiling sleeve type should be washed out with kerosene and then the bearing housing should be filled to the proper level with a high grade lubricating oil.

Ball bearings are properly supplied with grease lubricant when the unit leaves the factory. When additional lubrication is required for ball bearings, remove the plug in the ball bearing housing and insert the grease directly from the closest supply, thus avoiding any contamination or entry of dirt into the bearing housing.

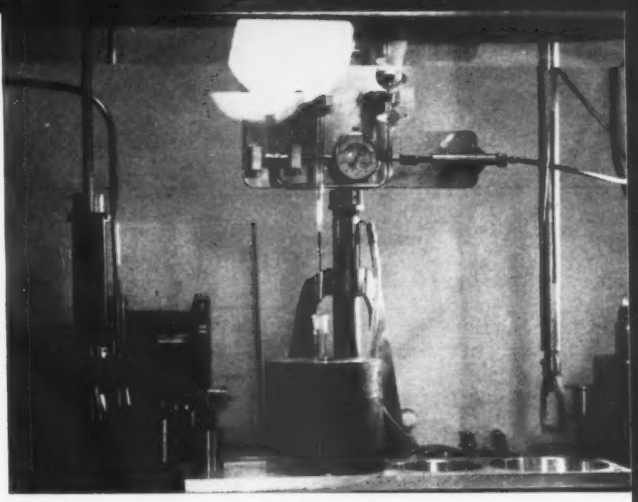
It is important that only grease of known quality be used and that it is free from acid or other injurious substances. Some bearings are supplied with grease cups or alemite fittings. In such cases, the cups or alemite fittings may be supplied with grease from a grease gun or other receptacle, but due care should be exercised to see that no dirt is admitted. The ball bearing housings should be about one-third filled with grease. To fill the housing completely would cause the bearings to heat.

Water-cooled bearings

Some pumps are equipped with water cooled, split type babbitt marine thrust bearings. The water for cooling purposes should be brought in from outside sources, except where the water being pumped can be piped to the bearing housing.

Bearing life can be greatly lengthened when clean lubricant is used. In making repairs, or in starting new pumps, or in servicing the pumps during the years of operation, extreme care should always be exercised to see that no dirt or dust is allowed to enter the bearing chamber.

When a pump has been in service for some time, it usually develops a sort of hum or tune which is constant during operation. Should there be a sudden change in the tune, or the pump becomes excessively noisy, then the operator should follow some of the suggestions made earlier in this article. Many times the change in the hum or tune will indicate to the operator that something is wrong and will give him advance warning of a procedure that might save serious difficulty.



HOT LABORATORY SCENES: (Left) Operator exercises remote control of devices faintly seen through transparent shield. At extreme left is shielded carrier for radioactive solutions being taken to lab for analysis. (Right) Close-up through shield (left to right) of bottle decapper, carriage containing sample bottle, and flask.

FISSION SAFETY SOUGHT

Pilot plant for radioactive chemicals tests new design for populous areas

EXPERIMENTAL equipment, for removing radioactive materials from gases has been installed in the AEC's National Reactor Testing Station chemical processing plant (Idaho Falls) in hopes that results will allow such plants to safely locate in populous areas.

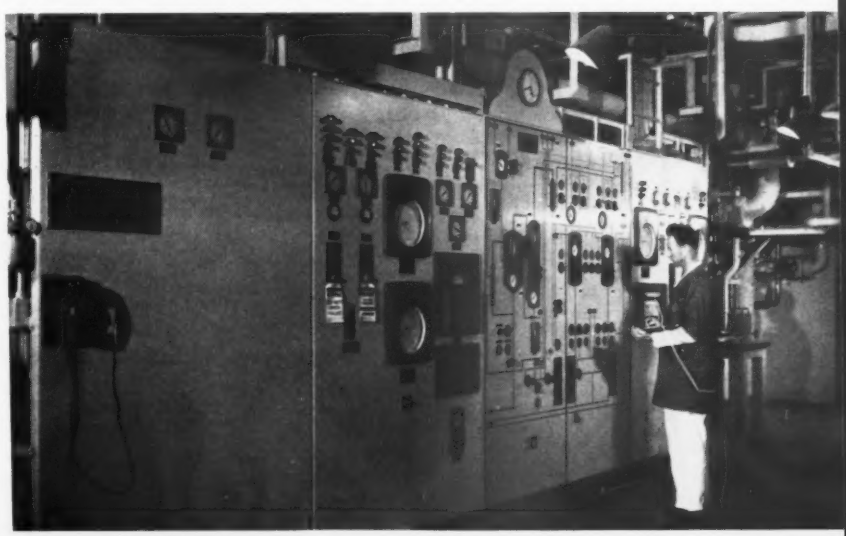
Built by Bechtel Corp. (of San Francisco) and operated by American Cyanamid Co., the plant is designed for direct maintenance, and incorporates a number of new design concepts expected to produce data important to the economics of reactor utilization. The plant is expected to demonstrate the feasibility of decontaminating individual cells in which the chemical processing is carried out, allowing workers to enter and do maintenance work. Due to intense radiation from fission products, previous processing plants have had costly methods for replacement of defective units by remote control mechanisms.

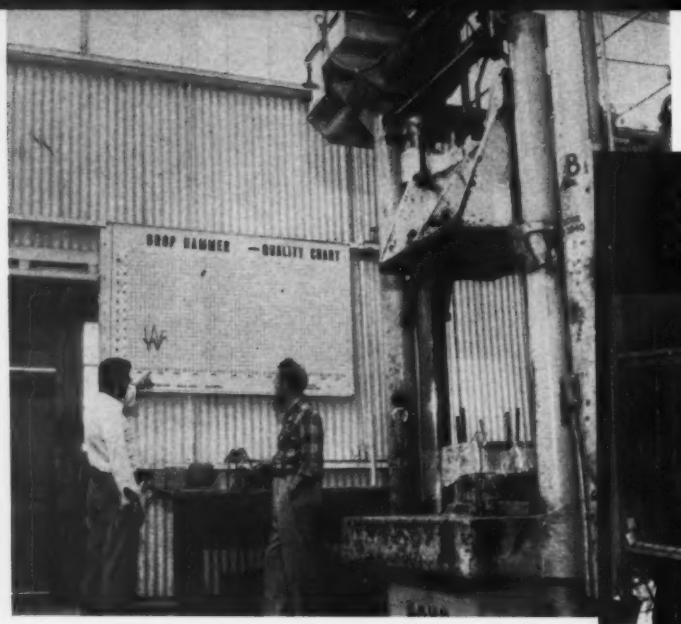
Fission products are removed from used fuel elements and are concentrated and stored in underground storage tanks. This process is required periodically, as the fouled elements hamper chain reaction within the reactor. Cost of this reprocessing is a major item in evaluating the economics of production of usable power from atomic energy. A large part of the expense comes from the necessity of purifying uranium-235 to a degree far beyond commercial standards.

The plant contains 38 miles of stainless steel piping and tubing, in addition to 125 miles of aluminum and copper tubing, and carbon steel pipe. Some 35,000 sq. ft. of sheet stainless steel was used in construction. Cost was approximately $34,000,000 and normal operating force about 300 people.

Workers are protected from radioactivity by a ventilation system providing the plant with 170,000 cu. ft. of filtered, washed air per minute. Wastes from laboratory drains are run through a "monitoring manhole" where they are checked for radiation.

LIQUID WASTE graphic control panel in waste disposal building of processing plant.





LEFT: Coordination essential. Harold Alting, foreman metal forming dept., Bob Hallahan, quality control analyst, review drop hammer quality record chart which reflects the per cent defectives causing rework and/or rejections. RIGHT: Burring operation quality checked.

A B C of STATISTICAL QUALITY CONTROL

THE USE of statistics in managing a business is commonplace to an executive, but the proposal to use those same statistical principles in his quality control program often brings forth a host of objections. These objections are founded on the belief that effective utilization of statistical quality control requires personnel with a doctor's degree in mathematics.

This theory is not true. Statistical quality control is another manufacturing tool, the effectiveness of which is demonstrated by the fact that thousands of large and small businesses are now using it.

Just exactly what is meant by the term "Statistical Quality Control"? The following definition has been generally accepted: Statistical quality control is a method of controlling the quality of production to a predetermined quality level by applying proven laws of probability to the inspection and production methods.

Two phases of control

Statistical quality control can be logically divided into two phases: process control (during production inspection) and product acceptance (after production inspection). The first phase, process control, is based on the control chart technique developed by Dr. Walter A. Shewhart. The second phase, product acceptance, is based in the sampling tables developed by Harold F. Dodge and Harry G. Romig.

A common practice at the start of production of any product is to examine a few of the items and, if they are satisfactory, to continue production. Upon completion the lot is submitted to inspection for sorting. The defective units, if found, are (1) scrapped, (2) returned for rework or (3) determined to be "usable as is" by a salvage action committee. In many instances manufacturers maintain no formal record of the reasons for the production of defective work, and until the rate of rework or rejections reaches expensive proportions, they attempt little or nothing to correct the trouble.

This same procedure, augmented by factual records maintained by Inspection on the results of inspection of each lot, is a start into statistical quality control. Go one step further and use the Shewhart control chart technique for "fraction defective" and another milestone has been passed. The "fraction defective" technique is simple to apply, since you need only be able to add, subtract, multiply and extract the square root of a number.

This fraction defective is equal to $\frac{\textit{Total Defectives in Lot}}{\textit{Total Units in Lot}}$.

For example, if four (4) defectives were found in a lot of one hundred (100) pieces the fraction defective for the lot would be 4 in 100 or 1 in 25. Then, if over a period of time in the inspection of 15 lots of 100 each a total of 85 defectives were found, the average fraction defective would be 85 in 1,500 or $\frac{\textit{Total Defectives in All Lots Inspected}}{\textit{Total Units in All Lots Inspected}}$.

We can use the information thus obtained to develop a fraction defective, "P" chart, based on the Shewhart technique. With the "P" chart we will find it possible to determine whether the amount of variation of each lot from the average could or could not be expected.

These are the basic concepts used to develop the control chart technique:

1. Any process will tend to produce the same results as long as it remains reasonably unchanged.
2. If the process is in control, the variation of each lot, from the average of all lots for fraction defective, will be within certain limits a very high percentage of the time. These limits are called the "chance cause" limits of variation, commonly set in America at the three Sigma limits.
3. Any lot which has a fraction defective beyond these limits indicates some new force operating within the process and any indication of this nature is assumed to be the result of an "assignable cause." This is an "out of control" process.

Probability statistics used in calculating control limits are similar to those used by insurance companies to calculate rates, gambling casinos to figure odds and payoffs and many other common applications of probability mathematics. Through the use of this simple chart a tremendous amount of information and background is gained with a minimum investment in inspection time.

Overcoming inspection delay

One problem which makes difficult the completely effective use of the "P" chart is the delay between actual production and the subsequent report to Production of the results of inspection. This problem, however, can be overcome. Instead of waiting for all parts to be produced, we can take samples of the work "in process" and use the results of these "in process inspections" to set up the same fraction defective chart. These are only two criteria for the taking of these samples:

1. Sample must be representative of the sub-lot from which it is taken. (Referred to as a "random sample.")
2. Size of the sample must be sufficient to insure that the information gained is reliable.

With this "in process" fraction defective chart a determination can be made whether to continue the production or whether corrective action is necessary. Through use of the control chart, it is now possible to predict *during production* the ultimate results of acceptance inspection and the overall quality of the work.

An investment has been made in process control and we expect the effective use of the knowledge gained through process control will pay for this investment.

By
ROBERT M. HUBSCH
Supervisor of SQC, Rohr Aircraft Corporation Chula Vista, California

Served as Project Officer of Statistical Quality Control at Wright Field from 1945 to 1948, thence to Rohr, became dept. supervisor in 1951

The utilization of this or one of the many other control chart techniques, such as the X and R chart for individual measurable characteristics, C chart for defects, etc., is fully explained and illustrated in numerous books on the subject, notably E. L. Grant's new edition of *Statistical Quality Control.*

Statistical sampling techniques

Having discussed process control, let us examine statistical sampling techniques for product acceptance. To understand the philosophy of sampling inspection we need accept only one new idea: When we use any sampling technique a predetermined risk is taken that a certain per cent of the product may be defective and still be passed by Inspection.

This risk is not uncommon, since with 100 per cent inspection some defectives are also passed by Inspection. Sampling plans merely insure, on the average, a maximum per cent defective which can be passed and this maximum is known. With 100 per cent inspection it is assumed that only good parts have been passed and the shock of finding defectives in the stock bins undermines all confidence in 100 per cent inspection effectiveness.

It must be recognized that fatigue and monotony contribute greatly to errors of inspection and that calculated risks must be taken in order to deliver a product with no undue delay. Errors caused by fatigue and monotony must be overcome or reduced to an absolute minimum. Sampling techniques will increase the effectiveness of your inspection and reduce delay between production and inspection.

Use of various types of sampling techniques have been very well covered in numerous articles, including an article in the December 1950 issue of *Western Industry.*

An additional step which is becoming more commonly used is the combination of process control and product acceptance into a simultaneous operation. Such a combination is especially prevalent and particularly useful in repetitious manufacturing operation such as punch press. A roving, process control inspector takes periodic samples of the work. If these samples are satisfactory the process is allowed to continue. If unsatisfactory, the process is stopped and various alternatives are considered: Operations can be added, tooling repaired, or production continued with the knowledge that a certain percentage or all of the subsequently manufactured parts will contain some defect.

Quality-cost ratio basis

Action taken must, of course, be based on the best quality-cost ratio. All costs, such as inspection time, material, rework time, line slowdown, etc., must be included and

total sample taken by the inspector must result in coverage at least equal to that given by a "lot to lot" sample. To accomplish such coverage, limits must be set for the sub-lot size from which the inspector takes his sample into increments slightly smaller than the "lot by lot" limits but retaining the same or larger sample sizes than those of "lot by lot" plans.

Using this method we can, if all of the samples have been satisfactory, accept the lot with no further inspection necessary. With process control giving "during manufacture" protection and simultaneously accomplishing "product acceptance" inspection we find that our investment repays itself in two ways: Cost of inspection usually has been reduced, while process control gains are free. However, net results should not be viewed as only a monetary saving in such direct costs as inspection, since many of the returns are of greater value, although not so conveniently measured.

No budding geniuses required

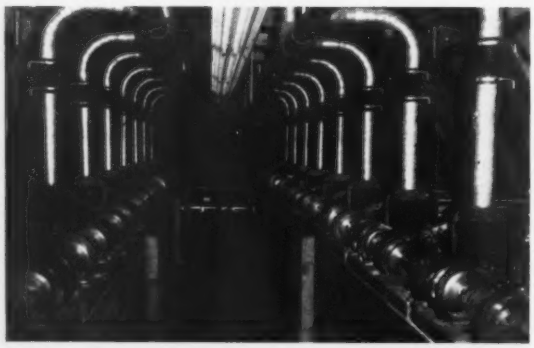
Other highly important yet intangible gains are these: We eliminate the guess work as to what is at fault, the operator or the equipment; we produce good parts on time and at the best quality-cost ratio, and we improve methods and procedures on processes which have been proven incapable of producing the desired results.

It should now be clear that many people are involved in a Statistical Quality Control program. The statement "Statistical Quality Control is 10% statistics and 90% ordinary horse sense and practical knowledge" is very true. The prime advantage of statistical quality control is its ability to sharpen decisions by giving horse sense and practical knowledge a supporting structure of facts.

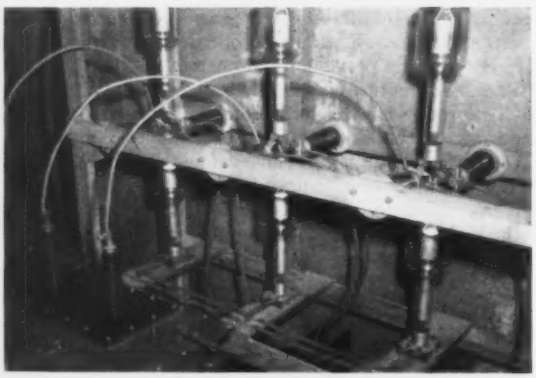
Utilization of statistical quality control does not require a budding genius. In fact the practical shop supervisor has already used many of the methods albeit not always to their fullest advantage. Cost of installing the system is not exorbitant and necessary personnel can usually be drawn from within the organization. You will find quality control personnel from other organizations are more than willing to assist in the training of your people and will gladly share their experience with you.

Use of statistical quality control as another "tool" in your manufacturing program is a "must" that should be *thoroughly investigated* by all forward looking executives.

NO INSPECTION LAG. Random sample of threaded elements from production sub-lot checked for concentricity by John Quint, process control inspector, to needs of the process control sheet.



ABOVE—Cracking units in equipment room. BELOW—Vault, containing resistors, capacitators and tubes. Vault acts as a storage battery, stepping up line voltage.



NUT CRACKING . . . . By ELECTRICITY

CRACKING WALNUTS by electricity has replaced mechanical methods at the new Portland plant of Northwest Nut Growers. Advantages of the new method are greater speed, less labor cost and improved quality through less breakage and chafing. Passage of current through the walnut sets up expanding gases that explode the shell from the inside out, analagous to the effect of lightning striking a tree and splitting it open.

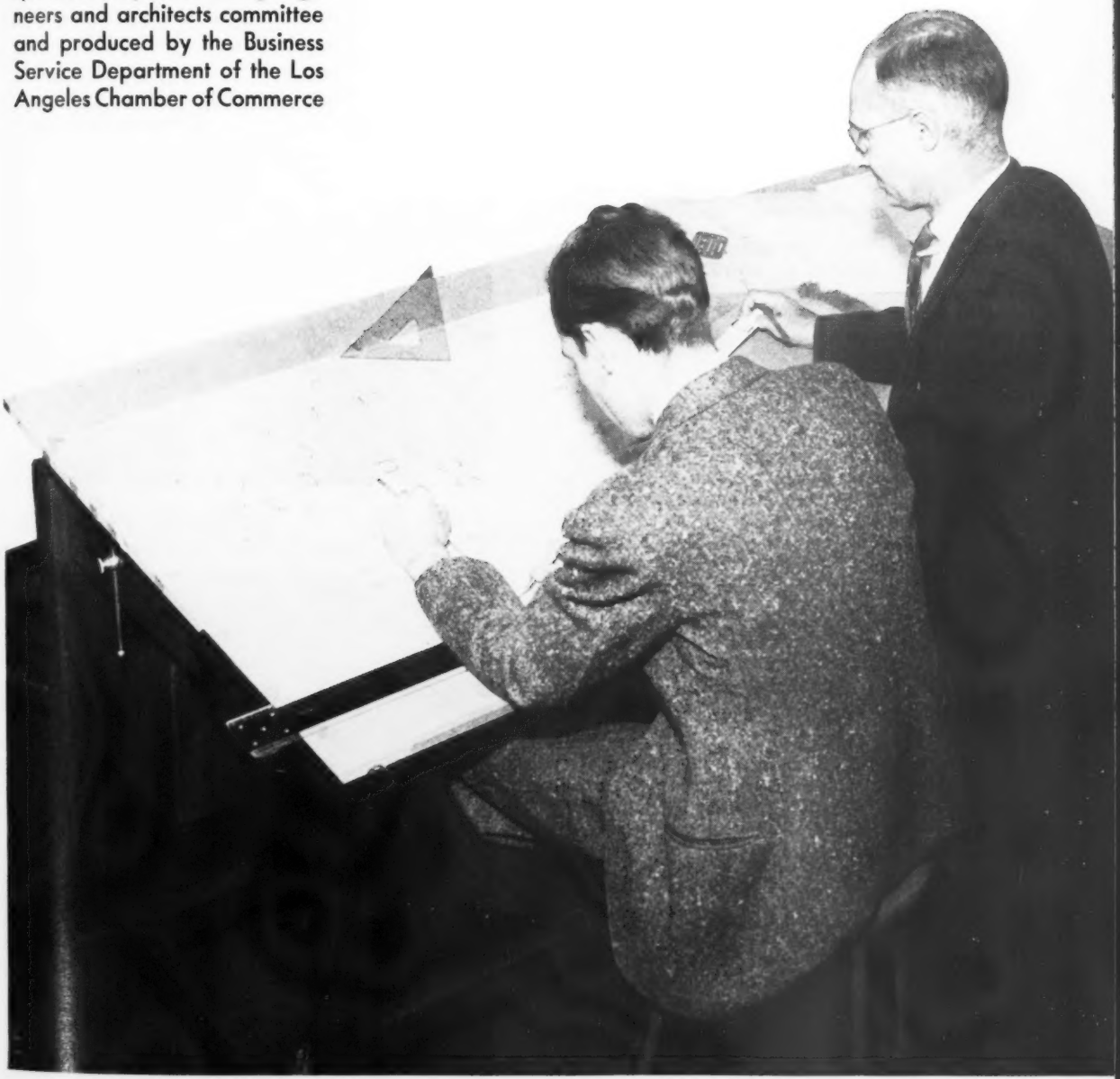
The nuts are conveyed into a well-insulated room of reinforced concrete on 18 chains which deliver them to two banks of nine machines each. As the nut is about to fall from the delivery end of the chain, an impulse of approximately 65,000 volts at 5,000 amperes shatters the shell and both meat and shell fall on a conveyor which carries them to vibrating machine where the two are separated.

Line feed of 220 volts AC is converted to DC by rectifier tubes and built up through transformers to the 65,000 volts needed. It is stored in a bank of capacitators and then triggered through an oversize distributor, complete with rotor and points, to the cracking machines themselves. To carry off the discharged current, grounding rods go 32 feet into the ground below the room.

PLANT DESIGN

A section devoted to its outstanding features under Western conditions

A thorough and comprehensive analysis, in the following summaries of papers from the recent Institute on Plant Design sponsored by a consulting engineers and architects committee and produced by the Business Service Department of the Los Angeles Chamber of Commerce

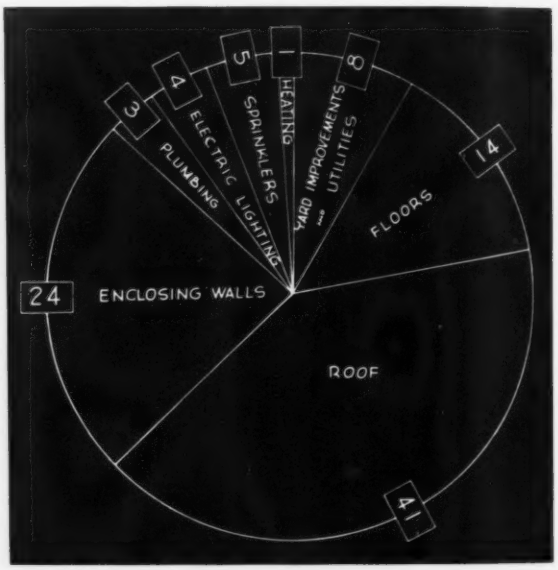


Which components cost most?

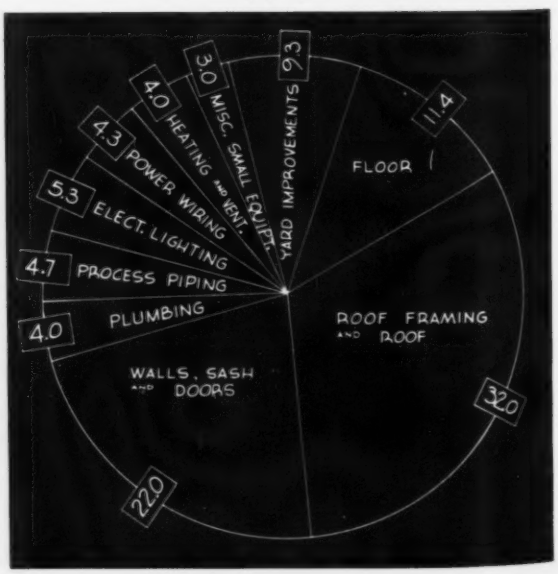
Recognizing real value of each fixed element enables you to visualize "bottlenecks"

ALBERT C. MARTIN, JR.
Albert C. Martin and Associates
Architects and Engineers

AVERAGE WAREHOUSE PERCENTAGES



MANUFACTURING BUILDING
with shipping and warehouse space



1 "BOTTLENECK" potentials of all the fixed elements should be established, and each fixed element given the appropriate attention required for the particular industry. Bottlenecks may be peculiar to the receiving of material or merchandise, transportation of goods from receiving to storage, from storage to fabrication or selection, or from these points to point of shipment.

2 Roof structure demands more consideration in warehouse type building than in a factory building. Not that one should have a less secure roof, but if relative values are to be assigned to the elements of industrial buildings, then different features take different values with different types. Obviously, in the factory type structure, the mechanical and electrical costs diminish the relative values of the other component parts of the structure.

3 Minimum roof structures common to minimum warehousing are often unsuitable for roof structures which can support overhead conveying equipment, and can be a serious obstacle in converting a warehouse to a factory. The architect-engineer should search for the structural frame which is the easiest to install with a minimum of cost. Some form of steel trussing or steel beams is often favored if the roof structure is designed with this consideration in mind.

4 Small importance of the perimeter walls. This should be realized, because throughout the Southern California area designer-builder contractors have been selling building with most of the accent on tilt-up construction. This is a fallacy and a poor premise for the selection of an industrial building.

5 Among the physical elements causing bottlenecks in the movement of material through the plant are column centers and ceiling heights. To get away from the 20-foot spacing, which we have inherited from wood design, it is only a matter of from 10¢ to 15¢ a square foot to employ a structural system which would have minimum spans of approximately 40 x 60 ft.

In buildings which have particular functions peculiar to some manufacturing processes, we can often find a module of measurement which will, through its consistent repetition, lead towards maximum efficiency of space. In some cases this is found through the proper selection of pallets, and in many instances it may be found through the averaging of production equipment sizes with the best average of work space located adjacent thereto.

WHO WILL DO YOUR JOB?

Past records of architect, engineer and builder are the basic things for consideration at the outset

By

HARRY L. MASSER
Executive Vice President
Southern California Gas Company
Los Angeles

A RECORD of successful accomplishments is the most important factor to consider in selecting an architect or engineer for a new industrial project. There must be coordination between the owner and the men he employs to build his plant. No one wants to entrust a complex or critical task to a person who has little or no experience in handling the responsibility.

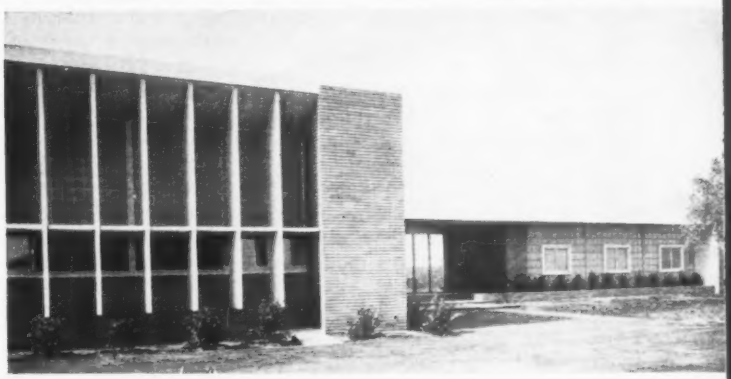
The prospective builder must also consider the experience of the firm in question and its staff. He must take into consideration the organization's recommendations and reputation, the caliber of its staff, and its operating methods.

In every job there are many opportunities for applying good ideas which may greatly reduce construction costs. A designing firm which is soundly cost-conscious can often save the owner many times the amount of the professional fee, as compared with an outfit which might complacently follow yesterday's working methods.

It is very important to employ structural engineers with sound knowledge of the Southern California area and its tendency toward earthquakes. Some specialization in design studies and expert knowledge to handle this problem smartly may be of great importance to the owner.

"LIVE WHILE YOU WORK"

(Above) Employees' recreation building at McCulloch Motors Corp., Los Angeles, has dining facilities (indoor and outdoor), theatre, bowling alleys, lounge



Metal smelters (center picture) can be artistic, too. El Segundo plant of H. Kramer & Son. Arthur Froehlich, architect. Below is the striking front of the Lever soap factory in Los Angeles. Welton Becket and Associates totally designed the McCulloch structure; were consulting architects for Lever plant

YOU'RE SUNK IF YOU don't know what's underneath

WILLIAM A. SIMPSON
President
Simpson Construction Company
Los Angeles

IT WOULD BE an economical mistake for a firm to retain professional services of anyone not having an intimate knowledge of the peculiarities of the area he is to work in. I say "economical mistake" because many people believe the only reason for retaining local talent is for the purpose of creating goodwill. Such is not the case in construction.

First of all, site selection, in some instances, has not received full attention before purchase, insofar as it is related to soil and foundation conditions.

Southern California is more or less a mountainous country. In and about Los Angeles, we have many mountain ranges such as the Santa Monicas, Hollywood and Sierra Madres. Sloping from these ranges to the sea is a great plain. This plain, plus the San Fernando Valley, forms the area upon which are constructed most of the plants in and around Los Angeles. Other sections in Southern California have similar conditions.

Variable soils

It is obvious that no records exist as to what these plains looked like centuries ago. We do know, however, that there were many arroyos, gulches and other variations in the general land table. Over the past hundreds or thousands of years, these have been filled with a silt washed from the mountains, resulting in variable soil-bearing conditions which are not known until investigations are made by competent professionals.

Good engineering practice demands that tests be made prior to construction. If tests were made prior to purchase, and assuming that other desirable sites are available, costly foundations could be avoided. By taking an option on the property and then retaining expert engineering services for testing and investigation purposes, it is possible to obtain facts which may change the price offered for the land or the desirability for purchase.

It is hardly consistent to expect to construct a plant for X dollars per square foot or for an amount equal to cost of a plant built elsewhere if foundation conditions are unknown and sites are not comparable.

I have known of costs of a plant constructed in the Middlewest on soil capable of carrying any reasonable loading, used as a budget amount for cost of a duplicate plant in Los Angeles where foundations were very costly and were required to a 60-ft. depth.

I could name a number of projects here in the Los Angeles area where soil conditions necessitated elimination of much-needed basements or caused large expenditures for special foundations. Remember that any costs for special foundations are charged to building construction and not to land acquisition, where it rightfully belongs.

Therefore, my point is that a local professional be retained to make exhaustive tests prior to full purchase. Similar conditions to those mentioned exist on Hollywood Boulevard where a number of large buildings had foundation troubles, due to silt from the hills filling pockets and gulches a long time ago, and which were unknown until tests were made for construction. In fact, many other parts of Los Angeles have similar conditions.

Specialized engineers

One of the greatest indications of progress in construction engineering is the advent of the engineer specializing in soil tests and stabilization. We are doing things today with filled ground that would make yesterday's constructors turn over in their graves.

Structural engineers are to be congratulated on their efforts to bring about an answer to the economic problem of earthquake insurance. Owners now feel that with reasonable safety they can ignore such insurance on buildings designed in recent years.

Our climate is such that a different understanding of heating, ventilation, and air conditioning is required than for colder or warmer climates. Eastern or Midwestern engineers tend to overstress heat and cold requirements which leads to greater costs than necessary.

Construction of any plant should be the result of common purpose planning by all whose services are needed for complete satisfaction.

FOR COPPER AND BRASS MILL PRODUCTS SEE THESE
REVERE DISTRIBUTORS
ON THE PACIFIC COAST

AMERICAN STEEL WAREHOUSE CO.
425 N.E. Ninth Avenue, Portland 14, Oregon
Phone: EAst 9111

AMERICAN STEEL & SUPPLY CO.
44 & 51 E. 7th St., Eugene, Oregon
Phone: 4-6291; 5-4126

EAGLE METALS COMPANY
4755 First Ave. South, Seattle 4, Washington
Phone: LAnder 9974

East 320 Trent Ave., Spokane 8, Washington
Phone: MAdison 2419

2336 North Randolph, Portland 12, Oregon
Phone: TUxedo 5201

PACIFIC METALS CO., LTD.
1400 So. Alameda St., Los Angeles 21, Calif.
Phone: PR 0171

3100—19th Street, San Francisco 10, Calif.
Phone: Mission 7-1104

261 W. 5th South St., Salt Lake City 4, Utah
Phone: 22-3461

19 No. 4th Street, Phoenix, Arizona
Phone: ALpine 4-0369

1533 India Street, San Diego, Calif.
Phone: FRanklin 9-5826

TAY-HOLBROOK, INC.
3530 Chester Avenue, Bakersfield, Calif.
Phone: BA 5-1221

940 Broadway, Eureka, Calif.
Phone: HI 2-4516

920 "M" Street, Fresno 18, Calif.
Phone: 6-8231

900 Alice Street, Oakland 7, Calif.
Phone: TE-2-4200

1801—22nd Street, Sacramento 4, Calif.
Phone: HI 6-3841

P. O. Box 969, Salinas, Calif.
Phone: 2-4771

605 Old County Road, San Carlos, Calif.
Phone LY 3-7631

165—8th Street, San Francisco 1, Calif.
Phone: MA 1-6800

695 Stockton Avenue, San Jose, Calif.
Phone: CY 2-3606

251 Roberts Avenue, Santa Rosa, Calif.
Phone: S.R. 6400

1234 So. Aurora Street, Stockton 8, Calif.
Phone 4-4841

1595 E. 2nd Street, Reno, Nevada
Phone: 2-6907

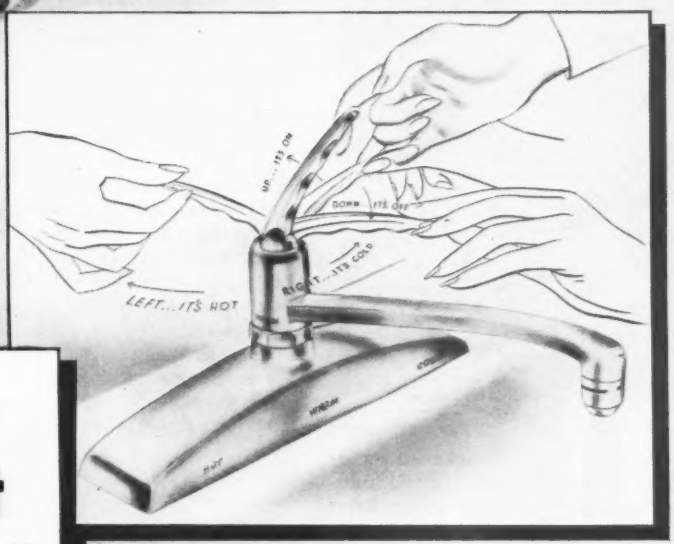
UNION HARDWARE & METAL CO.
5555 E. Ferguson Avenue
P. O. Box 3070, Terminal Annex
Los Angeles 54, Calif.
Phone: UNderhill 0-2411

REVERE
COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities. Distributors Everywhere.

LOS ANGELES: 6500 East Slauson Ave. Underhill 0-3331; SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282; SEATTLE: 1331 Third Ave. Main 1401

Moen Single-Handle Faucet, made by Moen Valve Co., Division of Ravenna Metal Products Co., Seattle 5, Washington.



Sketch showing operation of Moen Faucet, which can be operated by one hand, giving water at the desired temperature at any rate of flow. You can change volume without changing temperature, or change temperature without changing volume, or select the desired temperature before turning on the water. Available in various styles and types.

Faucet maker finds **unit cost more important** than cost per pound

This Moen Faucet is unusual. First, its design represents a new idea in faucets so far as we know. If we are wrong, we will welcome the correction. But in any event, this modern faucet is selling like mad; people really want its convenience, its simple operation, its one-hand control. The second unusual thing about the faucet is that the spout is made of Admiralty Metal, supplied by Revere. This metal was chosen by Moen after consultation with the Revere Technical Advisory Service, which pointed out the qualities of Admiralty from the standpoints of bendability, and plating characteristics. Everything considered, the "more expensive" Admiralty turned out to be less expensive in the end, and more satisfactory both to the Moen Valve Co. and to its customers. The faucet also uses Revere Free-Cutting Brass Rod for interior machined parts, this again being chosen for workability and corrosion resistance. Service to Moen and to many other industries in the Mountain State area is of course provided by the Revere sales, technical and mill personnel on the Pacific Coast. Similar services are of course available from Revere everywhere in this great country. To obtain the Revere services, see the nearest sales office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

LOS ANGELES: 6500 East Slauson Ave. Underhill 0-3331
SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282
SEATTLE: 1331 Third Ave. Main 1401

CHOOSING your LOCATION

Site costs may cost you a sight more if neglected

R. O. KUSCHE
President
Quinton Engineers, Ltd.
Los Angeles

A LOCATION selected because of its advertising value, or because it will add to the prestige of the firm may be expensive to develop into a usable area. This is because it is very often on a hillside or the top of a hill, or it may be a prominent corner at a major intersection that demands a value in excess of the cost of usual industrial property.

Among limitations on the use of industrial property which may increase the cost of development are restrictions included in the sales policies and terms of private covenants inserted into the deed by developers. Among these are use of the land, building lines, building construction and design (for example, prohibiting metal clad buildings, limiting building height and use of signs), off-street parking and truck loading requirements. Building codes also have a definite bearing on costs.

In most instances industrial plant processes do not lend themselves to serious differences in elevation between various areas of the building, and it may lead to unnecessarily high foundation costs. Of course, many times a slight difference in elevation may facilitate the arrangement of truck loading at dock height, or it may reduce excavation for basement installations, or even make possible gravity type flow of production lines, thus saving on power costs.

The cost of grading varies depending on the type of soil, moisture conditions, volume to be moved, accessibility and suitability for use of large earth moving equipment and the density requirements of the material placed in the fill. It is preferable to balance the earthwork within the site so that expensive borrow material from off the site is not required. It should be mentioned that it is not undesirable to place structures on filled ground, because it is possible to place fill so that it may have more stability than the natural ground.

Adequacy of drainage

Intensively developed industrial areas create impervious surfaces which produce a large volume of storm runoff. Because many industrial areas are developed in low lying land, careful investigation should be made of the adequacy of drainage facilities to keep from having interference in the flow of raw materials, finished products and working personnel.

For the least investment in drainage, some grading of a site is often necessary to direct the flow of water away from the buildings and off of the site.

In most instances, because of the extensive roof areas, subsurface drainage pipelines are needed to remove water from roof areas.

Where large structures are involved, or where heavy machinery is to be installed, poor soil bearing characteristics will increase building costs by requiring larger and deeper footings or even piles for larger structures. In addition, where heavy pieces of machinery require seperate foundations, these will also have to be of extra size and depth, and if vibration is a problem, extra precaution will have to be taken in poor soil.

Many fine industrial sites available have no sewer outlet, which means individual facilities must be developed. While the lack of such sewage system usually means the property is less expensive, the installation of septic tanks will satisfy only a small number of workers, and practically no waste from processes. Individual septic tanks are inadequate, and are a source of continuous maintenance.

Pavement savings

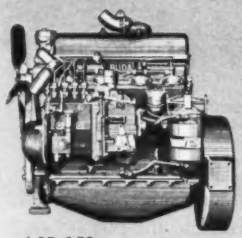
In connection with sewage treatment, it is important to remember that many industrial wastes cannot be directed into the sewer without some previous treatment because of the possible harmful action that would occur at the sewage treatment plant.

In pavement cost, a great deal of money can be saved by careful planning of truck routes to keep them well defined and off of areas for personnel parking, which needs only to be a light type of paving. In connection with paving, your soils investigation for foundations for the structure should be extended to include recommendations for compaction of earth fill areas, as well as for design of pavements, so that the maximum support from the native soil may be utilized.

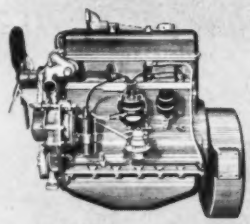
Matters of landscape improvement of a plant site are often entirely ignored. The professional services of landscape architects are available to demonstrate how it is possible by judicious planting of a few tolerant trees in the acres of pavement, or carefully planted terraces or courtyards, to help create more desirable working conditions and a very favorable impression of an industry by a relatively small investment in landscape improvement.

Finer IN EVERY WAY

Choose BUDA Diesel or Gasoline Power



4-BD-153
BUDA DIESEL ENGINE



4-B-153
BUDA GASOLINE ENGINE

Pick BUDA.... and get MORE VALUE

Never before have you been offered a line of fork trucks that promised —*and delivered* so much material handling speed . . . ecomony and stamina as the new Buda "FT" Series.

Beautiful to look at—but more important—tough, fast and maneuverable, Buda Fork Trucks are the product of the industry's outstanding design and engineering staff—men who *knew* the improvements required in fork truck design . . . and built them into the "FT" Series.

See these great new Buda trucks today at your nearby Buda Distributor's. You owe it to yourself. Write for Bulletin 1570. The Buda Company, Harvey, Illinois.

BUDA

ESTABLISHED 1881

THE LINE WITH ALL 3 FOR DIVERSIFIED HANDLING

BH-51

DON'T MISUSE SPACE

It's "creeping obsolescence"

BEN H. O'CONNOR
A. I. A., Lunden, Hayward & O'Connor, Architects, Los Angeles

CREEPING obsolescence would seem to indicate a gradual outgrowing of things that were once adequate. It may occur anywhere from the stockpile to the director's table, in the production of raw materials or in the merchandising of the finished product.

As the name implies, obsolescence is generally gradual. The mere fact that sales are down this year may be the result of other factors, and hence insufficient thought is given to the possibility that plant facilities may be the reason. It is only when all other possibilities have been exhausted that plant obsolescence is likely to be discovered.

Outgrowing the shell

Obviously outgrowing the need for any process leaves vacant the space in which that process took place, at least momentarily. To use any space for an outworn process contributes to the obsolescence of the whole. The adverse effects are easily seen, although sometimes we find them obscured by other factors.

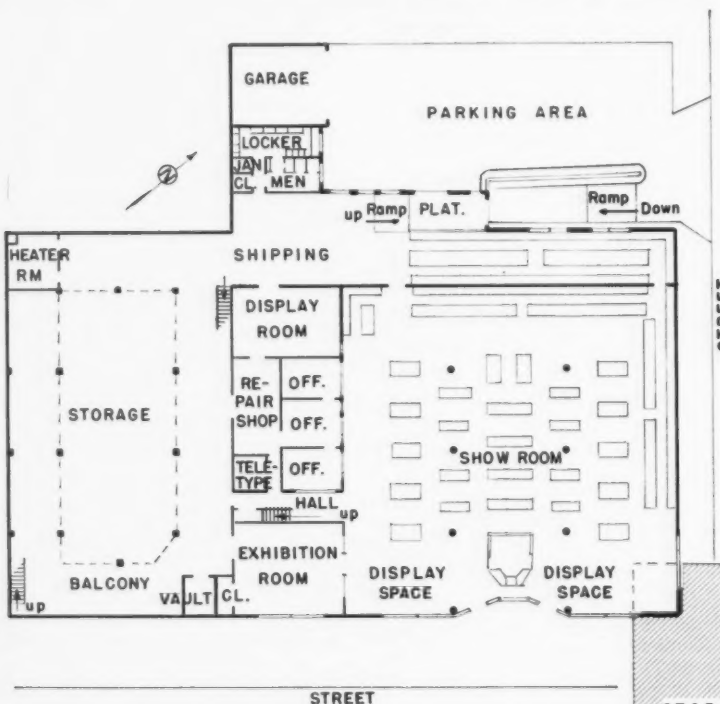
1. Inefficiency due to crowded conditions.
2. Inefficiency due to excessive distances between related departments.
3. Higher turnover due to unpleasant or inconvenient surroundings.
4. Higher accident rates due to poor planning.
5. Higher production costs resulting from the above.

I prefer the term "mis-use" of space in referring to obsolescence. The cost of inefficiency resulting from the overcrowding of men or machines is easy to see. The cost of lack of parking facilities, however, is not so apparent.

Similarly, in these days of increasing records and other paper work, the relation of spaces occupied by clerical, engineering and production staffs is of greater importance than ever before. The study of revised flow charts is a must. Centralized locker and toilet facilities, once so common, mean wasted time and production in passing to and fro. Likewise, isolated executive or managerial offices mean more infrequent contacts between administration and production, with consequent lack of understanding on the part of each.

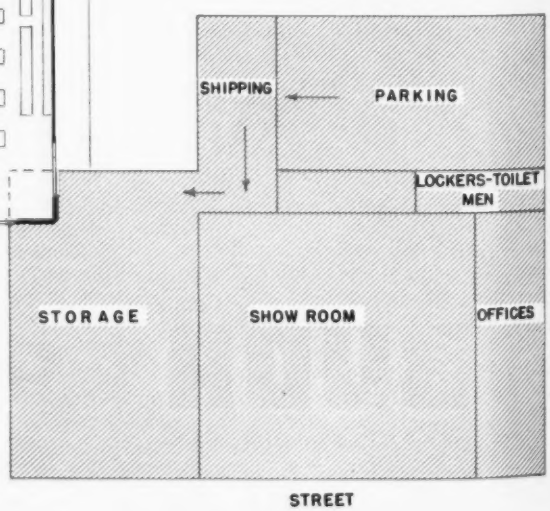
Take a good look

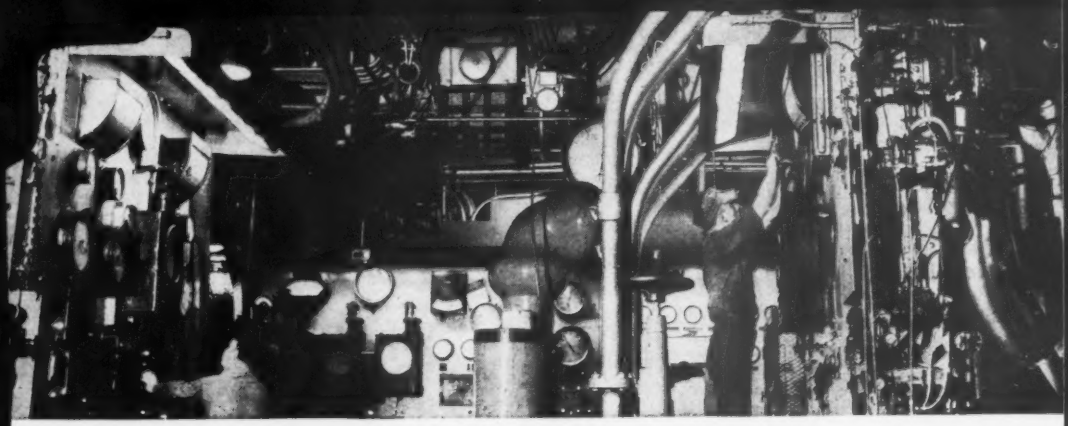
All of these factors reflect themselves in lower efficiency, higher overhead and production costs, fewer sales, and economic ill health. My purpose is to call attention to the need for constant re-examination of your operations to determine if the spaces occupied by each department, each process, actually each person, are adversely affecting the overall operation and the economic health of your industry. The fundamental principles of good planning will go a long way to avoid it and will materially aid in offsetting its effects, once it has caught up with you.



GOOD SPACE USE: All activities accessible from central offices. Locker rooms in good relation to working areas. Clerical offices and women's lockers are on the mezzanine over offices.

BAD SPACE USE: What a difference it would make to place executive offices on the corner for outside exposure. Of course no one in his right mind would do it, but how many of us are?





STOP COSTLY PIPE-LINE FAILURES

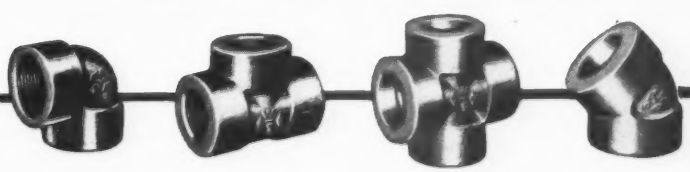
No one knows better than you the increasingly high cost of unscheduled outages due to pipe-joint failures. But do you know just how far it is possible to go toward *eliminating* such failures throughout the life of your piping systems? The answer to this critical problem in production and maintenance costs is FORGED STEEL FITTINGS by the pioneer firm of Watson-Stillman—consultants and suppliers to *all* major industries concerned with pipe joining and maintenance.

Watson-Stillman fittings are FORGED for maximum strength, toughness, and resistance to corrosion, vibration, and shock. More uniformly precise in all dimensions, they are the modern go-between wherever pipes meet permanently.

Leading Refineries, Chemical Plants, Public Utilities, Refrigeration and Industrial Plants throughout the world stay on stream at lowest cost-per-year with the famous Double-Diamond Fittings by Watson-Stillman. Write for literature.

Screw-End and Socket-Weld Types

SOLD THROUGH LEADING DISTRIBUTORS



WATSON-STILLMAN FITTINGS DIVISION

H. K. PORTER COMPANY, INC.

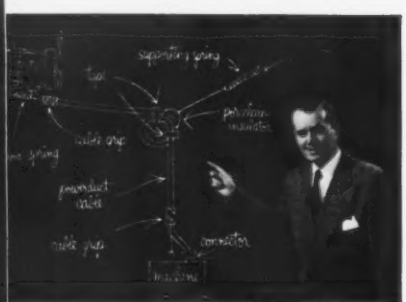
136 ALDENE RD., ROSELLE, NEW JERSEY

9-0-5

FLEXIBLE BUSDROP CABLE

POWERDUCT eliminates expensive rewiring when equipment must be moved.

This cable makes machinery mobile



PLUG IN POWERDUCT at busduct and machine. See how spring keeps cable taut. There is no costly rigid conduit to rip out.

You may not be utilizing the full flexibility of your busduct system . . . if you aren't matching it with equally flexible, UL-approved ANACONDA Powerduct Cable.

This busdrop cable permits you to quickly relocate machinery. There is none of the expense and bother of ripping out permanent or semi-permanent wiring.

Powerduct is the only nonmetallic-armored busdrop cable approved by Underwriters' Laboratories, Inc. for busway branches under section 3646, 1951 National Electric Code. Always ask for it at your regular supplier. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 53319

ANACONDA®

TODAY'S HEADQUARTERS FOR INDUSTRIAL WIRING

Building wire and cable • power and busdrop cables • control and communication wire and cable • distribution cables • magnet wire • wire and cable accessories

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

ANALYZE—SITE, SPACE, FLOW

Complete study of every detail is your best assurance of satisfactory results

H. L. GOGERTY
A. I. A.
Architect
Los Angeles

Basic planning:

1. Owner will establish what the proposed plant is to produce and the volume of production for which plant facilities are to be provided.
   a. Rough schematics must be developed to determine size of site required. Frequently the site is already owned in which case size of the site may be the determining factor as to the volume of production and the ultimate size of a manufacturing facility.
      (1) Plants will establish manufacturing or processing procedure will be developed and extended from existing standards and practices.
      (2) Electronics, atomic energy and similar plants for which definite prototypes have not been established must be kept most flexible.

Logistics planning:

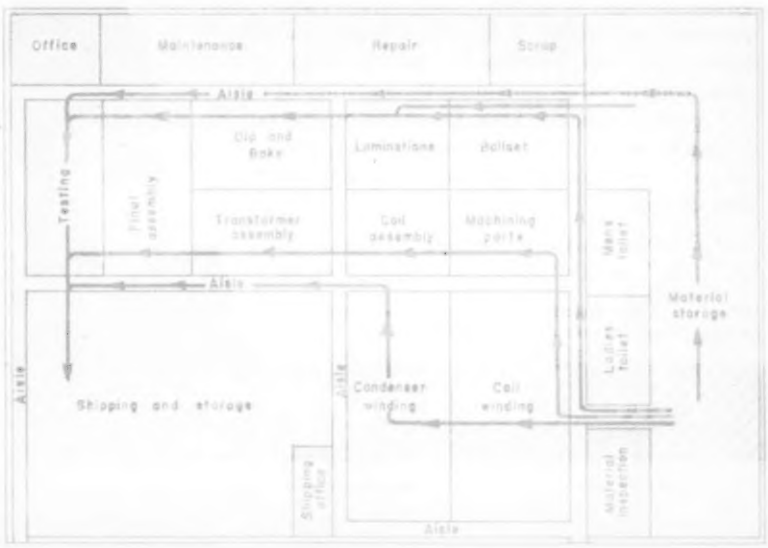
1. Fundamentals of plant layout:
   a. Major part of production work is material handling, not processing. The cost of material handling ranges from over 50% up to 80% of total production cost.
   b. Speed and cost of production are determined by adequacy of material handling facilities.
   c. Production efficiency is determined by limitation of the plant layout.
2. Manufacturing processes are affected by plant layout; for example:
   a. Distance traveled by parts or worked material in the course of their manufacturing or processing.
   b. Time consumed in this travel and the resultant cost.
   c. Number of processing operations and their related sequence.
   d. The manufacturing cycle for the product.
   e. Receiving and storing of materials.
   f. Transporting materials into the plant, through processing and out of the plant.
3. Material handling equipment must be given important consideration:
   a. Conveyors.
   b. Cranes.
   c. Fork trucks, skids and pallets.
   d. Elevators.
4. Warehousing of both raw material and finished product:
   a. Concentrated or decentralized.
   b. Horizontal or high tier storage.

Space planning and coordination:

1. Preparation of flow chart:
   a. Should be done by architect or industrial engineer or design firm with such experience and in close cooperation with plant layout

LAYOUT AND FLOW

Schematic plan especially prepared for Western Industry by Mr. Gogerty indicates allocation of areas and production flow chart for efficient manufacturing operation



engineer and department heads, supervisors and maintenance engineers.

b. Careful study should be made of:
   (1) Manufacturing methods.
   (2) Time and cost analysis.
   (3) Production planning.
   (4) Works equipment.
   (5) Tooling requirements.
   (6) Power loads.

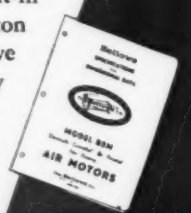
c. Based upon this analysis there should then be prepared a process flow chart.
   (1) Ideal flow is direct line from receiving, through processing, terminating with shipping without backtracking, or rehandling in storage.

2. Prepare tentative plant layout based on flow chart:
   a. Revise and develop as needed until a layout satisfying all requirements is accomplished.
      (1) Work stations.
      (2) Aisles.
      (3) Storerooms.
      (4) Tool cribs.
      (5) Service islands, locker rooms, toilets, etc.
      (6) Material handling facilities.
      (7) Warehousing.

HERE'S AN ELECTRICALLY-CONTROLLED

WITH ALL CONTROLS BUILT-IN

The Bellows Model BEM Air Motor is a complete straight line power unit in itself. There are no extra valves to buy. The electrically-controlled Bellows Electroaire 4-way directional valve is an integral part of the cylinder. Bullet fast, shock free. The solenoid control units are unconditionally guaranteed against burnout. Low voltage assures safety to operator and machines. Works perfectly flooded with coolant or piled with grinder dust or chips. Built-in speed control valves provide full regulation of piston rod speed in either or both directions. No expensive piping to install. Unique construction requires only one air connection which can be made with flexible hose.



The Bellows Air Motor is made in 1¼", 1¾", 2½", 3⅝" and 4½" bores. Any stroke length.

Write today for Specification Bulletins and Case History Files. Address Dept. WI-553.

1156

The Bellows Co.

733 E. Pico Blvd. of California Los Angeles, Calif.

b. After many revisions, changes and alterations will a final *plant layout* be selected.

My own high mark to date is the making and testing of 34 alternate layouts for one plant before arriving at the one *and only one* extremely simple and clean cut arrangement which most nearly harmonized the ideal and practical layout in all particulars.

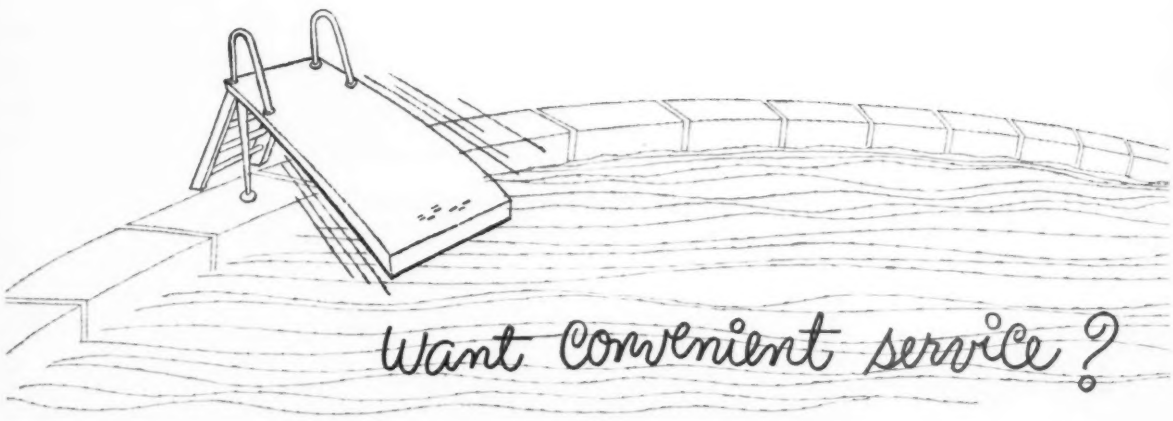
3. Develop site plan:
   a. Based on plant layout information. Master site plan recommended to avoid later expense and delay. Management can plan its investments in plant construction and expansion with greater economy and utilization.
   b. Locate process and storage buildings, power plant, administrative office and special facilities including cafeteria and maintenance services.
   c. Locate railroads and sidings, waterways, roadways and parking.

4. Develop preliminary planning based on plant layout information:
   a. Plant building designed to house plant layout.
   b. Primary element is process as integrated in plant layout.
   c. Studies to diagram material handling system, process piping, power lines, offices and service factilities such as shipping and receiving departments, stores, cafeteria, medical department, toilets, washrooms and locker rooms, etc.
   d. Consider plant expansion and site limitations.

5. Advantages of scale models for final development:
   a. Convenient for visualizing the project.

6. Develop plans and preliminary cost estimates for budget purposes:
   a. Design may require necessary adjustments in plant layout. These must be kept to minimum and be minor in nature.
   b. Development of all planning requires cooperation of architect-engineer, plant engineer and the estimator.
      (1) Keep design functional.
   c. Fundamentally, two basic differences in plant designs:
      (1) Ground plan of building.
      (2) Number of stories.

Concluded on page 54



LET REPUBLIC SUPPLY YOUR INDUSTRIAL NEEDS!

Republic isn't exactly a "supermarket" but you might be amazed at the variety of products and services Republic Supply's to basic industry...to the mining industry, to construction, utilities, refineries and to the oil fields—to the chemical and process industries, and to many others. Republic's products and services are backed by experience and the facilities of two large warehouses, five sales offices and 9 field stores.

Moral: Let REPUBLIC SUPPLY your industrial needs. Wherever you are and whatever you do, you will do better with Republic Supply's friendly, helpful service.

* * * *

THE REPUBLIC SUPPLY COMPANY OF CALIFORNIA

REPUBLIC RS SUPPLY CO

Exec. offices in Los Angeles & San Leandro. Phones—Los Angeles: UNderhill 0-2511, UNion 1-5168; San Leandro: LOckhaven 2-0414, Enterprise 1-1060

Pipe, valves and fittings • abrasives • shop supplies and tools • rigging materials • mechanical rubber goods • machinery • oil field supplies

An independently owned and operated company serving Western industry

ANALYZE SITE, SPACE AND FLOW

. . . Continued from page 52

d. Consider size of bays:
   (1) To accommodate plant layout.
   (2) To give greatest flexibility for future change.
   (3) Height of overhead clearances for operations.

e. Cost factors determining column spacing:
   (1) Higher construction cost of longer spans.
   (2) Lower operation cost with longer spans.
   (3) Manufacturing and assembly may dictate long clear span—i.e., aircraft assembly.

f. Consider the service facilities:
   (1) Receiving, shipping and warehousing space and roof supports — trackage and conveyor systems.
   (2) Test areas, inspection points and dispatch stations.
   (3) Maintenance facilities, tool cribs and sprinkler systems.
   (4) Power and lighting systems. Power plant operations to include steam for heat, processes, etc. Also chilled water for cooling. Electric power distribution for motor drives, for lighting.
   (5) Administration office: Consider size and location, number and grouping. Consider light, heat, ventilation and air conditioning.
   (6) Employee service facilities: Consider approaches, parking lots and entrances or exits. Consider lunchrooms, cafeterias and kitchens. Consider first-aid and medical departments. Consider locker spaces, washrooms, rest rooms and toilets. Consider time-keeping system and plant security—an extremely important item.

After all of above items are properly and adequately provided for in the preliminary working drawings, then final working drawings and specifications can be prepared.

SMALL PLANTS NEED good layout because they do biggest part of work

1. Ninety-two per cent of the industrial plants employ less than 100 workers and they account for 32% of all production.
2. Twenty-five per cent of production comes from a small number of large plants employing more than 1,000 workers.
3. Forty-three per cent of all production comes from plants employing between 100 and 1,000 workers.

The plant layout is as important for the small plant as it is for the larger plant. Efficiency of production is important in the small plant as in the large but doesn't involve interrelationship of several coordinated departments existing in larger plant.

FOR HELP ON HYDRAULIC OR . . .

PNEUMATIC POWER PROBLEMS

. . . CONSULT RUCKER

Here you deal with West's largest firm specializing in fluid power systems. We're completely equipped to supply components, design systems to fit your needs, manufacture and install. Power and control systems designed or built by RUCKER are in use on:

EXTRUSION PRESSES • SCRAP PRESSES • PRESSES FOR FOOD, TOBACCO, HAY, TILE • TRIM SAWS • LOG DEBARKERS, TURNERS AND KICKERS • CONVEYORS • CHEMICAL AND PROCESSING EQUIPMENT • METAL SHEARS • STEEL BILLET KICKERS • OIL DRILLING RIGS • CONCRETE PIPE EQUIPMENT • BATCHING PLANTS • DAM GATES • TRUCK HOISTS • SPEED REDUCERS • MATERIALS HANDLING EQUIPMENT • TESTING MACHINES • FARM TOOLS

This RUCKER-designed hydraulic unit powers explosion-proof densifying machine in chemical plant. Driven by 1200 r.p.m., 30 hp. motor, delivers 30 g.p.m. at 1500 p.s.i.

Call us NOW . . . our field men are all experienced mechanical and chemical engineers, qualified to understand your needs. No obligation.

THE RUCKER COMPANY — Specialists in Fluid Power Systems

HYDRAULIC & PNEUMATIC COMPONENTS • ENGINEERING • MANUFACTURING

24

4956 Firestone Blvd., South Gate, Calif., Kimball 8271 • 4228 Hollis Street, Oakland 8, Calif., OLympic 3-5221 • White-Henry-Stuart Bldg., Seattle 1, Wash., MAin 2783

One-Stop shopping

for brass rod and bar

You can get rod or drawn bar of Chase Free-Cutting Brass, Copper or a wide variety of other copper alloys at one stop — *the Chase Warehouse nearest you!*

When you want free-cutting materials, it pays to buy Chase — for Chase rod and drawn bar yield the shorter chips that make for *easier machining, longer tool life.* They produce smooth, clean-surfaced products — less expensive to buff or polish before lacquering, enameling or plating.

And when it comes to re-ordering, remember that Chase alloys are uniform — repeat orders of the same alloy always have the same cutting characteristics.

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

LOS ANGELES 54, CAL. • 210 S. Central Ave., Tel. MAdison 6-0101
SAN FRANCISCO 7, CAL. • 680 Second St., Tel. GArfield 1-7780
SEATTLE 4, WASH. • 1957 First Ave., South, Tel. SEneca 1862
DALLAS 2, TEXAS • 119 Pittsburgh St., Tel. PRospect 4271
HOUSTON 1, TEXAS • 16 Drennan St., Tel. CApital 7266
DENVER 2, COLO. • 1706 Welton St. at 17th St., Tel. AComa 3685

ELECTRICAL AND MECHANICAL COSTS AND REQUIREMENTS

Percentage costs will vary from 12% to 50% of total construction expense

RALPH E. PHILLIPS
Ralph E. Phillips, Inc.
Mechanical and Electrical Engineers
Los Angeles

THERE IS NO common denominator by which we can ascertain a certain percentage of the total cost of mechanical and electrical work in comparison with the total construction cost of the four basic types of industrial buildings: (1) common warehousing, (2) light industry, (3) heavy industry, (4) technical type of industry, involving precision and research.

From statistical records, it can be stated that from a simple warehouse to a technical industrial plant, the percentage of mechanical and electrical systems will vary from 12% to 50%. This does not include machine equipment used in the process of industrial manufacturing.

The problems included for mechanical and electrical systems pertaining to industrial plants can be qualified as follows: (1) steam boiler plant; (2) heating system; (3) ventilating and air conditioning system; (4) sanitary plumbing; (5) process piping; (6) fire protection; (7) electric light and power systems; (8) utilities systems, including water supply, sewage collection and disposal, and electric light and power service.

Some industries require steam processing and such steam is usually maintained at high pressure from 50 to 125 pounds, in which case it is economically feasible to use steam supply or hot water circulating unit type heaters. However, it is my opinion that where steam is not required for industrial purposes, more economy can be ef-

Continued on page 58

UNIT AND SQUARE FOOT COSTS

FROM RECORDS compiled in Mr. Phillips' office over a period of years, but based upon probable current costs, the following unit and square foot costs are submitted as a general guide:

Heating:

1. Direct fired gas unit heaters (per sq. ft.) ..... 40¢
2. Hot water or steam boiler with suspended unit heaters (per sq. ft.) ..... 60¢
3. Forced warm air heating with zone fan systems and limited duct distribution (per sq. ft.) ..... $1.25 to $1.50
4. Hot water boiler with convector radiation (per sq. ft.) ..... $1.00 to $1.25

Air Conditioning:

1. Combined air conditioning and heating systems through distributing duct using chilled water for cooling and hot water or steam coil for heating (per sq. ft.) $1.90 to $2.25

Plumbing:

1. Industrial quality (per plumbing fixture) ..... $200.00 to $250.00
2. Office building quality (per plumbing fixture) ..... $250.00 to $300.00

Fire sprinkler system (per sq. ft.) ..... 35¢

Electrical:

1. Warehouse type lighting (per sq. ft.) ..... 40¢ to 60¢
2. Light industry and shop buildings (per sq. ft.) ..... $1.00 to $1.50
3. Precision type and research industry (per sq. ft.) ..... $1.50 to $2.00
4. Administrative areas (per sq. ft.) ..... $1.75 to $2.00

High pressure boiler plants:

(Which includes normal rated horsepower boiler auxiliaries, breeching and stacks) ..... $200.00 to $250.00

Diesel generating plant ..... $125.00 to $150.00

Radial drilling operation on the riding ring

Big, precision jobs like this are typical of the operations performed daily at National Supply's Industrial Products Division.

This giant gear, 17 ft. 2 in. in diameter, was cast in six pieces, joined and machined to close tolerances. Each of the pair of riding rings, weighing over 25,000 lbs., was cast in two pieces and is 17½ ft. in diameter. When installed, the gear will drive a large, rotating ore drying tank supported by the rings.

Cores are set for the casting of the riding rings

National's fully integrated Torrance plant is equipped for the start-to-finish manufacture of machinery for heavy-duty operations. Its facilities serve every type of industry in the western states—steel, shipbuilding, aircraft, transportation, mining, etc.

You'll find it worthwhile to send your tough jobs to Torrance, where the most complete facilities serve the most exacting needs of western industry.

INDUSTRIAL PRODUCTS DIVISION

THE NATIONAL SUPPLY COMPANY

TORRANCE, CALIFORNIA · LOS ANGELES AREA

IDEAL PRESSED STEEL FORGINGS • BILLETS AND LARGE BARS
STEEL CASTINGS AND SPECIAL MACHINERY

MELTING • FORGING • CASTING • MACHINING • HEAT TREATING
ASSEMBLING • WELDING • TESTING

90% OF YOUR HANDLING PROBLEMS END WITH NOELTING Faultless

ALL-PURPOSE 900 SERIES CASTER with DRAWN-STEEL WHEEL

Here's your caster-selection problem reduced to a simple answer.

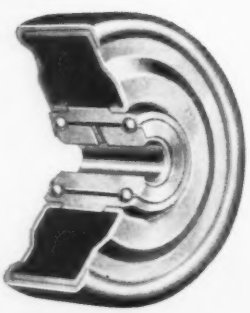
1. *One type* caster.....
2. *Three* wheel sizes.....
3. Eight kinds of wheels..... (including Drawn Steel)

} 23 Caster-Wheel combinations to choose from

All of your *medium duty* and *general purpose* trucks can now be equipped from standardized stock of *one type* caster. It's the direct way to increase materials handling efficiency, by simplifying caster service, avoiding break-down delays, saving maintenance work. All types of wheels are interchangeable in corresponding size Caster horns—to suit any floor condition prevailing.

Further facts gladly furnished, on request, no obligation.

LONG-LASTING, PRECISION-MADE *DRAWN STEEL WHEEL*



These deep drawn wheels are made to tolerances typical of fine tools and, like any quality equipment, are the best investment for trouble-free service. The ball bearing hub, as illustrated, is standard. The heavy gauge corrugated sides and double tread support static loads up to 4 tons per wheel. Round edges of tread are easy on floors, won't chip or break. Wheel is absolutely concentric for smooth operation. Exclusive Faultless design and production. Ask for illustrated literature, no obligation.

FAULTLESS CASTER CORPORATION EVANSVILLE 7, INDIANA

Pacific coast office and warehouse: 1252 So. Boyle Ave., Los Angeles 23, California.
Stocks carried for immediate delivery

ELECTRICAL AND MECHANICAL COSTS AND REQUIREMENTS

. . . Continued from page 56

fected in capital investment and operation by the installation of unit gas fired space heaters.

Very often the problem of heating, especially in Southern California, is not given sufficient serious thought, to the point where no heating is done. There are, of course, certain types of heavy industrial plants operating with open door conditions where a general heating system would be quite ineffective and probably would not add to the efficiency of the plant. In any event, if heating is desirable, it is not necessary to maintain inside temperatures of 70 degrees, but just sufficient to take the chill off the space to 60 or 65 degrees.

Types of heating

Some plants, by the very nature of their use, might require that there be air supplied to the building; in such case, unit zone supply fans at mezzanine level, with limited duct distribution system and thermostatic control should be installed.

Where air ventilation is not a factor, then consideration should be given to unit type heaters of either steam, hot water or gas. Additional consideration should be given to floor radiant type heating where employees work on the floor level, as for example, garages, mechanical maintenance shops and ship lofts.

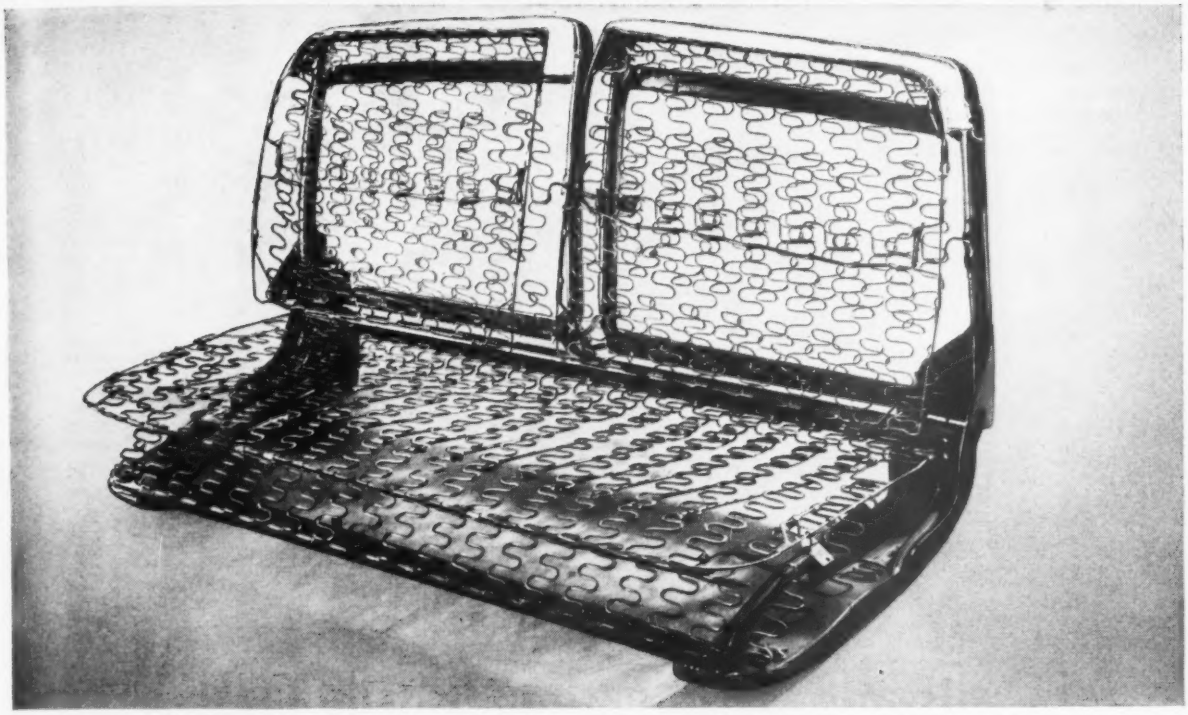
Sanitary systems follow a general pattern, depending upon the number of employees involved. Concentration of sanitary requirements will reduce the capital cost of installation. In selecting a site, consideration must be given to available water supply for domestic and fire protection, method of sanitary sewage disposal and availability of natural gas supply.

Electrical systems

Electrical supply involves many considerations. If the plant is small, the problem is simple, just a question of obtaining secondary service from the public utility department, usually involving service for 120/240-volt, single phase for light and 240- or 480-volt, 3 phase for power.

But in plants involving areas of 100,000 square feet and over, serious consideration should be given to primary metering at high voltage, whereby light and power is purchased at the same rate, and from which metering point, the owner purchases light and power at high voltage and distributes

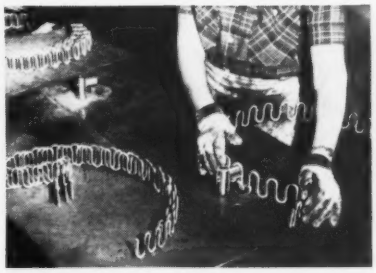
Concluded on page 61



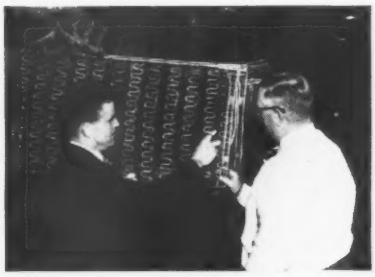
Over 300 tons of U·S·S Manufacturers Wire are needed every month to produce car seat assemblies like this at the Standard Steel Spring Co. in Los Angeles. Each unit contains about 20 pounds of this uniformly high quality wire from Columbia-Geneva.

Here's how Standard Steel Spring Co. makes a car seat

This zig-zag wire former turns out 169 feet of convoluted wire per minute. Besides the 9-gauge wire used here, there are more than 1000 other types, grades, and finishes of U·S·S Manufacturers Wire available. Columbia-Geneva also can produce tailor-made wire to meet your own specifications.



Air-operated benders are used to form the convoluted wire for assembly. Making these zig-zag springs is just one of the many uses for U·S·S Manufacturers Wire. Columbia-Geneva, with the greatest wire-making facilities in the West, also produces wire for everything from bolts to bed springs.



Harold Sloan, right, General Manager of the Los Angeles Division of the Standard Steel Spring Co., here examines a finished unit with a Columbia-Geneva specialist. Mr. Sloan says, "We like U·S·S Manufacturers Wire. It meets the high standards required in the auto industry. And it's always of uniform, high quality."

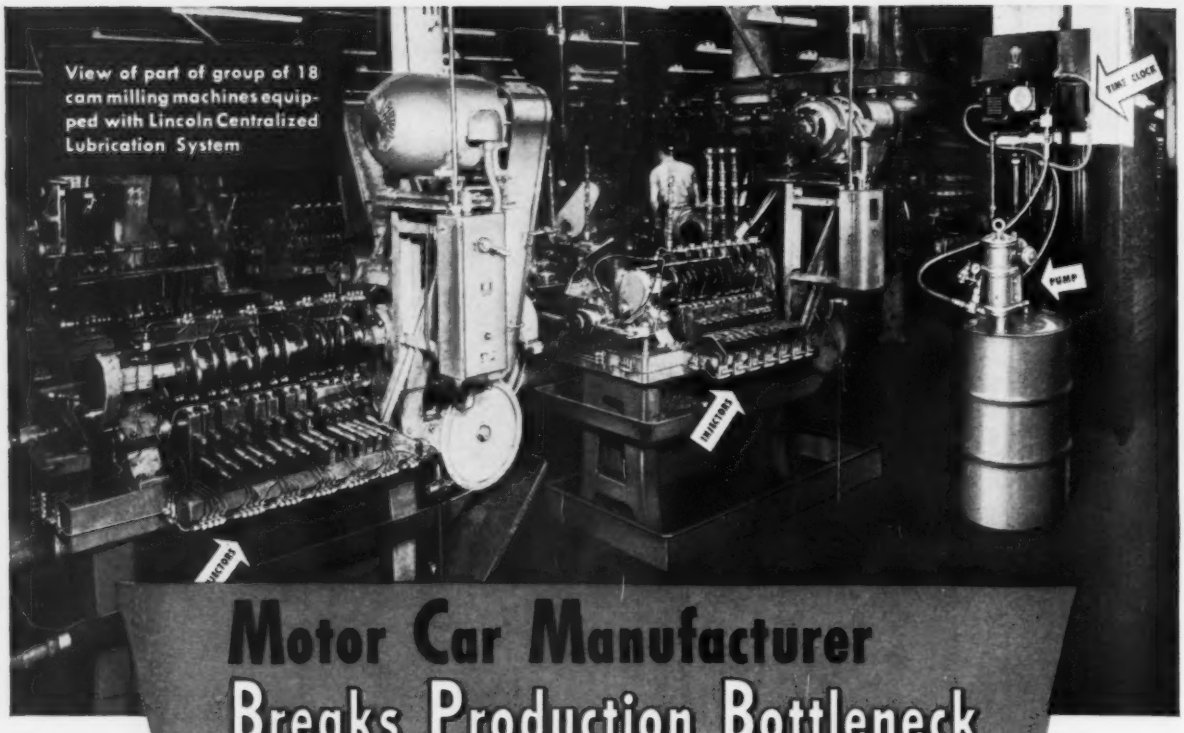
For any type of wire you need, rely on U·S·S Manufacturers Wire. It's production is rigidly controlled by United States Steel from raw ore to the finished product. Columbia-Geneva specialists are always available to help you select the wire that's right for your job. For information write to Columbia-Geneva Steel Division, United States Steel Corporation, 1403 Russ Building, San Francisco 6.

Columbia-Geneva produces wire that's tailored to fit your needs

U·S·S Manufacturers Wire

Columbia-Geneva Steel Division, United States Steel Corporation, San Francisco

UNITED STATES STEEL


View of part of group of 18 cam milling machines equipped with Lincoln Centralized Lubrication System
TIME CLOCK
PUMP
INJECTORS

Motor Car Manufacturer Breaks Production Bottleneck with *Lincoln* CENTRALIZED LUBRICANT APPLICATION SYSTEMS

- **Slashed Rejects by 80%**
- **Increased Production Materially**
- **Eliminated Down-time Due to Bearing Failure**
- **Eliminated Down-time for Lubrication**
- **50% Reduction in Quantity of Lubricants Used**
- **Reduced Machine Noise, Increased Operator Efficiency**

One of the country's largest Motor Car manufacturers wanted to increase production in its cam milling department to gain a competitive advantage—but found that the time required for delivery and installation of additional machines made that solution impractical. The problem was solved—and the cost of new machines was saved by installing a Lincoln Centralized Lubrication System on the existing battery of 18 Cam Milling Machines.

The automatic time clock controlled system increased production by eliminating down-time due to bearing failures and by eliminating 80% of rejects. This installation has been so successful that they have since equipped 15 crank pin lathes and 11 crankshaft cheekers with Lincoln Centralized Systems—and are planning to equip other departments.

Real savings like these are being made throughout industry by discarding old-fashioned oil cans and grease guns and replacing them with modern Lincoln Systems that CONTROL lubricant application. Applying the *right* lubricant, in the *right* quantity, at the *right* time with a Lincoln Centralized System can bring these advantages to production machinery in your plant.

To find out more, write for your FREE copy of Catalog 80

• • • PIONEER BUILDERS
LINCOLN ST. LOUIS
LUBRICATING EQUIPMENT • • •

LINCOLN ENGINEERING COMPANY of California, 2844 So. Grand Ave., Los Angeles, Calif.

This is a typical duct work installation for an industrial air conditioning system which employs the double duct type of distribution.

ELECTRICAL AND MECHANICAL COSTS AND REQUIREMENTS

. . . Continued from page 58

through his own system for the required light and power voltages.

This means that the owner will install his own transformer load centers. In this case it is recommended that the lighting system be of the 4-wire, 3-phase design, also being available for small power uses and the heavy power on 3-wire, 3-phase at the desired voltage to serve equipment. The 4-wire, 3-phase lighting distribution system will effect copper savings of approximately 25% and additional savings in operation by the combined light and power rate.

This is entirely an engineering and economic analysis as to the advisability of this type of light and power system, and must be thoroughly ascertained as to the savings involved against the capital investment required to install it.

Control of general illumination for industrial plants should be carefully considered so that large areas are not illuminated where only small areas require it. In simple installations use panel box control. In larger installations, as for example, involving high bay light, use remote low voltage control to contactor panels located at truss walk-ways on mezzanine level. Consideration must be given for power bus duct if required.

Fire protection must be given careful consideration, as it involves compliance with building ordinances and also insurance. Industrial plants that are over area as prescribed by law must be provided with a fire protection system. Ordinance compliance, in many cases, does not satisfy that which will be required by the Board of Fire Underwriters of the Pacific in order to obtain a reduction.

This is also an economic problem, and there are occasions where it will be found that it pays only to comply with law requirements and accept the penalty in insurance rates because the additional capital investment involving the underwriter's requirement is too great to warrant the savings on insurance.

Administrative areas

In newly developed and remotely located industries it might be necessary and advisable to install an exterior loop fire main with fire hydrants in order to externally combat a fire; the locations and investigation of fire stations and water mains should determine this requirement.

Most heavy industries have an area in the plant itself or a separate building devoted to administrative work. This area or separate building has in the past been sadly neglected for properly conducting clerical and administrative work due to poor lighting, poor ventilation and insufficient heating. Usually these administrative areas are located where dust and smog prevail, and as a general rule industrial plants are located at interior areas where summer temperatures are high.

More thought should be given in the design of administrative areas which should be provided with air conditioning, high intensity lighting and underfloor duct systems for open clerical spaces. A good ventilating system will not solve the problem of uncomfortable high interior temperatures by introducing outside air at 90 or 95 deg.

There is only one solution for this problem and that is air conditioning by refrigeration or low temperature well water. In high temperature, arid climate, fair results can be obtained with direct evaporative cooling.

In isolated areas where numerous outages have occurred which might affect the continuous operation of a plant, it might be advisable to consider emergency diesels in order to maintain operation during such periods. But before an isolated plant without outside service could be considered advisable, the by-product heat of such a generating plant must be substantially consumed over the entire industrial working year so that such heat reclaim can be used for industrial and heating purposes.

An ideal reason for electric generation is exemplified by the Hyperion Activated Sludge Plant at Playa del Rey. This particular plant has nine 1,750-hp. diesel combination gas and oil fuel engines. Five are driving generators for the plant and four drive the high pressure blowers.

In this case the normal fuel is sewer gas from the digestor tanks and with the cooling process of the engines, known as vapor phase, which involves closed loop, high temperature cooling, emits the heat of the cooling water by flashing into steam when the pressure is reduced at a flash boiler. This steam is then used to maintain high temperatures in the digester tanks for activating bacteria. Actually this is an example of perfect heat balance.

DON'T GET THEORETICAL IN SELECTING YOUR MATERIALS

Practical angles will very often throw your theories for a loop. Each job is peculiar and specific

VINCENT PALMER
A. I. A.
Vincent Palmer & Associates
Architects and Engineers
Los Angeles

THE SELECTION of materials for any building program is determined by factors that are peculiar and specific for each job, consequently, general recommendations cannot be made.

It is customary to speak of material costs and labor costs when considering building costs. There is no thing as material cost. All costs in a building are labor.

All cost is labor

For instance, a forest in Northern Canada with no access has no value, even if the trees themselves are the finest in the world. The labor of building a road, a barge, or a railway to that forest brings to it a value of like amount. Only in labor, then, does the cost of the lumber produced arise. Therefore, if we think of all building as labor, we come nearer to the truth of the origin of cost.

Some of the reasoning that should govern the selection of materials follows:

1. *Theory*. It can be a poor method for selection, frequently being carried to extremes. For instance, in one local factory, the theory of ample lighting directed the use of almost continuous glass window areas for the exterior walls of the building.

The resulting light intensity was so great that the accompanying shadows appeared dead black in contrast, and the contraction of eye pupils due to brilliance denied adequate sight penetration to the work in shadow. So uncomfortable and hazardous a condition resulted that the plant is now experimenting with paints to apply on the glass of the windows for reduction of light conductivity.

Ventilation is another theory that can be carried to extreme. How many air changes per hour? Most theories on this subject disregard the extent of ceiling height above the work area. In hot weather, the higher the ceiling the greater the thickness of the hot air or heat blanket that can be tolerated, and the more efficient the use of gravity flow ventilators on the roof. Yet in cold weather this theory works in reverse and creates a greater heat load to accomplish the desired condition at the work level.

2. *Load*. This reasoning uses "load" as covering such phases as structural loads, mechanical loads, personnel requirements and services, and is one of the easiest factors by which poor selection can arise. Often the restricted economics of a venture tempts the selection of minimum loads for the basis of design.

Roof truss failed

A Los Angeles plant designed roof trusses to carry light crane loads, since economy was a factor. The designer knew that the roof live loads are rarely if ever realized in a building. This live load, in accumulation, exceeded the required crane load in quantity. To save money he omitted all impact factors from the design and when built, a roof truss failed.

Another load which frequently tempts under-design is that occasioned by weather. For purposes of representing a very low price, the proper use of waterproofing is often sacrificed.

Plumbing loads are another possible hazard.

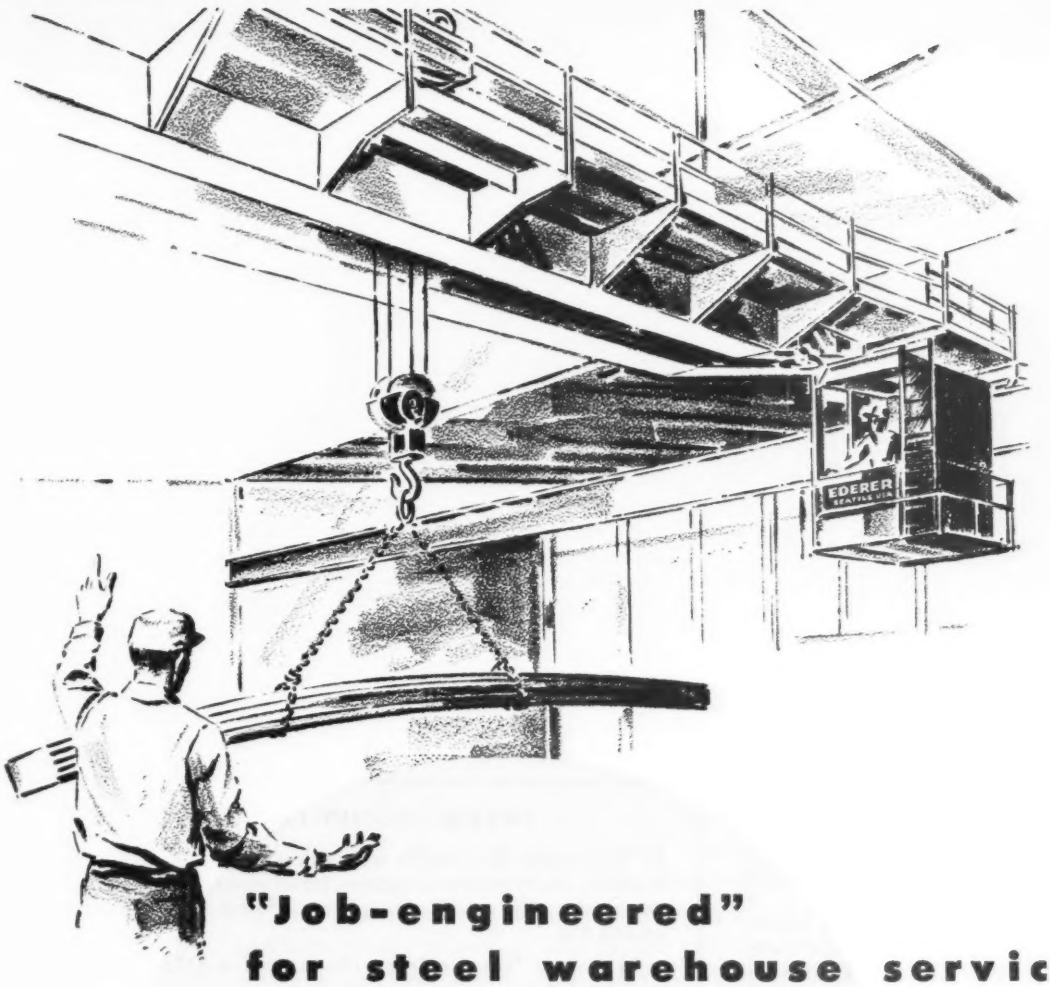
3. *Maintenance*. Theoretically, construction which requires the least-recurring replacement or maintenance is eventually the least costly. Within today's economy this is not necessarily

Concluded on page 64

A DOLLAR IN BUILDING

IF CAPITAL COST

IF EXPENSED



"Job-engineered" for steel warehouse service

This EDERER crane moves steel rod in the warehouse of one of the West's largest suppliers of such materials. This type of materials handling calls for rapid, economical operation. EDERER "job-engineered" this single-trolley, 5-ton crane, with 67-foot 5½-inch span, to meet the specific requirements of the job. This crane is typical of hundreds of cranes engineered and built by EDERER to meet exacting job specifications.

Whatever *your* industry, you have *your* particular handling requirements. EDERER—one of the largest crane manufacturers in the West—can "job-engineer" a crane to meet them. Delivery can be made to meet your schedule for plant expansion or new construction.

Write for Crane Bulletin CR-500 226C53

EDERER
CRANES

EDERER ENGINEERING COMPANY 2935 First Ave. So. • Seattle 4, Wash.

Export Division: 301 Clay St., San Francisco 11, Calif.

OVER 50 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY

SELECTING MATERIALS FOR YOUR PLANT

. . . Continued from page 62

true; however, low maintenance costs are important. Maintenance dollars should be spent on items generally depleted through use as compared with items of a so-called permanent nature.

Walls vs. floors

For instance, walls of a building are not normally depleted, whereas the floors can be subjected to a maximum abuse in use. Construction that would require high costs in maintenance of walls, such as caulking, painting, crack repairs, etc., is undesirable. It would be wiser to invest in a better wall construction and then devote the maintenance dollar to the floor surfaces that are subject to wear.

4. *Insurance.* Though often disproportionately evaluated, there are certain costs which can be minimized if definite predetermination of the insurance carriers is established. Rarely do requirements of insurance carriers and fire departments reconcile, with the former often requesting extra facilities which the fire department considers unwarranted or ill-advised. A predetermination of the carrier should be made before plans are completed, thereby permitting a limitation of the requirements.

5. *Taxes.* They are rapidly becoming one of the major determinants, particularly in a building program. With corporation taxes exceeding 50% of income, in most cases, a dollar of cost costs the owner 50 cents or less, while a capitalized dollar of cost requires an earning of $2.00 or more. Thus a 4-to-1 ratio exists where a capital dollar is required versus an expense dollar.

Often a higher rate of insurance is appreciably less costly than a high investment of capital dollars. It can be shown for instance, that it is cheaper to install three roofs of ten-year life span each, than one roof lasting 30 years.

6. *Time and availability.* A hidden cost frequently incurred in a building project arises out of a specification which disregards the law of supply and demand. Efficient industrial design must select materials in view of the time and availability of such materials. Often the contractors allege that the professional counsel has specified materials that carry a penalty in their procurement.

7. *Flexibility.* Any industrial plant should be designed for maximum flexibility. Fixed and rigid requirements can limit the use of a building such that it might be called "one-purpose," and a one-purpose building is to be avoided whenever possible. Materials should be selected to permit the greatest possible changes in use.

8. *Sales.* One phase in selection of materials based on sales program is the attempt to give the professional counsel a sales advantage. It should be remembered that all costs arise out of labor, there being no material costs. Thus diverse costs of building arise out of efficient use of labor, and not out of any method to "beat the market." Selection of materials which result in a quotation offering appreciably discrepant cost should be viewed with suspicion, as it forms the basis for most of the litigation involving the construction industry.

Ego is expensive

On the constructive side, a "sale" point of view will require that the finished project be salable, and this criterion is of great significance. Queer architecture, materials, and construction can anticipate a queer market.

9. *Ego.* Selection of material based on ego is extravagant and generally unwarranted. This basis for selection is customary in monumental projects, but is rarely justified in industry. Prestige and advertising value in industry are more enhanced by efficient production and competitive costs than by over-emphasis on "swank" and "impression."

SAVING MONEY ON YOUR ROOF

IT IS undoubtedly possible to engineer and install a 30-year roof on a building. In hypothetical figures, let us assume such a roof to cost $25 per square. The actual earnings cost of such a capitalized roof would exceed $50.

In contrast, let us analyze a 10-year roof at $12:

Capital earnings required, $24	$24.00
Repair @ 50% for 11th year, $6, expensed	3.00
Repair @ 50% for 21st year	3.00
	$30.00

Thus the penalty due to taxes on the 30-year roof would amount to 66% more than the repairs and maintenance of the ten-year specification.

FIGURE COST ANGLES in choosing process

HOWARD H. HEILMAN
Chemical Engineer
Los Angeles

GREAT CARE should be used in selection of any process which will manufacture only one given specific product. Unless absolute market assurance is obtained for ready sale of the product, the possible exorbitant conversion cost to make another product may result in great financial loss.

The matter of continuous vs. batch processing is definitely not a clear-cut choice favoring the continuous process. Batch processing has much to offer from the standpoint of flexibility and adaptability and, in addition, large-scale continuous operations have been shown many times as being incapable of realizing anticipated higher efficiencies over batch methods.

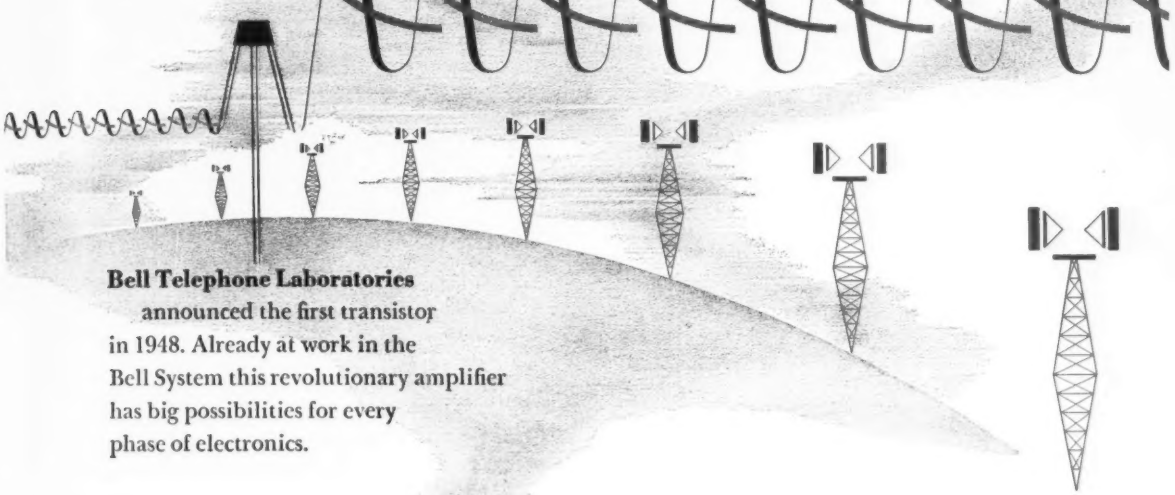
In considering selection of a process for a totally new product, the possible need for process conversion is a primary factor. Particularly in the chemical industry, the first five years in production of a new product often demonstrates drastic price reductions and rapid obsolescence of manufacturing method or product specifications. These eventualities should be considered as probable instead of possible and process convertibility becomes almost a controlling in choice of process.

It is well to balance on apparently higher capital investment in selection of a process if this results in the ability to utilize lower cost and poor quality raw materials or if it permits greater product uniformity in order to assure a competitive position.

In any review of processes, it is obvious that careful study is required on the "turn-over" ratios for different processes or products. Thus, comparison should be made of the ratio of the unit selling price of the product to plant investment per annual unit of production. These turn-over ratios vary from 0.6 to as high as 6 or 8 for many chemical processes and study of these ratios will provide much information as to rate of return on investment, or comparison of sales income per dollar of new plant investment.

NO. NINE OF A SERIES

pioneers in precision



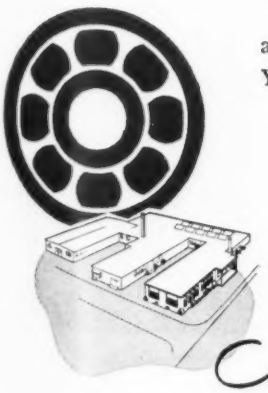
Bell Telephone Laboratories announced the first transistor in 1948. Already at work in the Bell System this revolutionary amplifier has big possibilities for every phase of electronics.

Miniature Precision Bearings

of the radial bearing type, were originated by **MPB** many years ago. From an original group of five bearings, **MPB** has designed and developed a completely integrated line of more than 130 types and sizes. This variety of **MPB** ball bearings provides a ready solution to some of the most difficult miniaturization projects. Over three thousand discriminating customers are currently being supplied with **MPB** components for specific applications.

MPB ball bearings are fully ground, lapped, and/or honed to ABEC 5 tolerances or better. They are torque tested, ultrasonicly cleaned, supplied in specific tolerances and classified within the tolerances for prompt assembly and maximum performance. **MPB** ball bearings are normally supplied in 10 design series, from 1/10" to 5/16" o.d., of high carbon chrome bearing steel. Most are also supplied in stainless steel and some in beryllium copper. All are assembled with highest quality balls.

The wealth of engineering knowledge amassed through participation in the application of more than a million miniature ball bearings is available to you. Your request for our new catalog WI5 will receive prompt attention.



We'd like to include you in our future production plans. Recent expansion in production facilities has enabled us to broaden our ability to serve you promptly.

Miniature *precision* Bearings

Incorporated MPB Keene, New Hampshire

"Pioneer Precisionists to the World's foremost Instrument Manufacturers"

save
space
weight
friction

PACIFIC AREA REPRESENTATIVES
Los Angeles, Edward D. Maltby Co., Inc., 1718 South Flower St.
Phoenix, Edward D. Maltby Co., Inc., 120 S. 4th Ave.
San Diego, Edward D. Maltby Co., Inc., 745 - 15th St.
San Francisco, Albert M. Schweitzer, 290 Ninth St.
Honolulu, Edward D. Maltby Co., Inc., 1358 Kapiolani Blvd.

OSBORN

BEFORE: Closeup of helical gear before deburring.

Gone . . . costly thorns in their side

Burr removal by muscle methods is aggravating because it is costly, inefficient and non-uniform in quality. Here's how a truck manufacturer has banished these "thorns in the side" with push-button brushing.

The operation: to deburr, break and blend the flank edges of gear teeth prior to shaving and heat treating. Formerly done with a hand tool, in several operations, the work was tedious and required close inspection and reworking to meet rigid specifications.

Now, an Osborn Brushing Machine in one speedy operation smooths the entire tooth edge . . . produces *uniform blending* of surface junctures of *every tooth*. Result: lower costs and greater precision for *better performance* of the product in service.

Find out how *you* can cut your costs and improve *your* products with power brushing. Call the nearby **O**sborn **B**rushing **A**nalyst or write *The Osborn Manufacturing Company, Dept. Q-3, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

AFTER deburring with Osborn Brushing Machine.

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

CARRIED IN STOCK BY LEADING INDUSTRIAL DISTRIBUTORS IN WESTERN STATES

AUXILIARY STRUCTURES

Relate them to the master plan. Don't let them become road blocks to expanding main structure, nor bulging space hogs

L. W. DAVIDSON
Donald R. Warren Co.
Engineers
Los Angeles

AUXILIARY structures can be defined as units contributing to the support of the main function of the master plan.

Power plants, power distribution systems including sub-stations, reservoirs and pumping stations, waste disposal plants, municipal garages, fire stations, storage buildings for explosives or volatile materials, airport control towers, weather stations and fueling facilities, wharves and docks, subaqueous structures, rocket ranges, launching towers and similar test facilities, silos and water towers, all fall under the classification of auxiliary structures.

Modern problems such as sound absorption, handling giant aircraft, limited space, and off-shore drilling operations, represent an increased challenge to the designer. Each project must be analyzed to satisfy the design criteria established by site conditions, and the function that the structure must serve in relation to processes housed therein.

Useful and pleasing

For a power plant serving an industrial development of some magnitude, number and maximum size of boilers is determined by the fluctuating steam load of process equipment, while the more constant load, such as comfort heating, at times makes the installment of a small unit for off-peak operations very desirable. Determination of these requirements immediately establishes design of this auxiliary structure.

Characteristics of design of auxiliary structures should be both functional and pleasing to the eye.

Location must be carefully considered with relation to the master plan. The unit should not be placed in the path of future expansion of the main structure, nor should its own function when expanded, create a condition detrimental to the master plan.

Prevailing winds, fumes, hazardous occupancies, noise, disturbing vibrations, etc., are factors greatly influencing selection of a location for the auxiliary unit.

Investigate the soil

Soil conditions must be considered when heavy loads are contributed by equipment or structure. Surface drainage is also important in the prevention of undermined foundations. Undue settlement usually creates serious problems. Soil investigations take guesswork out of foundation designs, and controlled compaction of subsoils during construction provide insurance against "settlement cracks and costly corrective measures."

Materials should be selected to harmonize with main building design; however, availability, speed of construction, access, structural requirements, maintenance costs or flexibility may be deciding factors. Maintenance of the structure through the years should be considered carefully in choosing materials for construction.

Observance of the results of wear and tear of exterior parts of the building and the internal use and abuse of mechanical procedures provides an excellent background that is very helpful when new structures are being planned.

AMERICAN CAN CO. Stockton plant. (1) Car port for executives. (2) Large incinerator, partly obscured. (3) 100,000-gal. water tank. (4) 240,000-gal. ground storage reservoir for fire reserve. (5) Pumphouse for electric and diesel-electric pumps if city supply fails or sprinkler system pressure drops. (6) Propane standby gas tank. (7) Cooling tower. (8) Transformer station.

OBSOLETE STUFF EATS YOU UP

Clinging to out-of-date mechanical equipment may seem smart, but it is actually costing you money

LESTER R. KELLY
Mechanical and Electrical
Consulting Engineer
Los Angeles

ADVERSE EFFECT resulting from mechanical equipment or design no longer current can be directly traced to (1) increased cost due to continued use of obsolete equipment or design; (2) increased cost as a result of a labor burden caused by unsatisfactory working conditions.

We will discuss here the result of ill effects and increased costs occasioned in an industrial plant through management being unaware of equipment and designs which through a period of time have become out of date, or obsolete.

Mechanical equipment can be in excellent operating condition, but obsolescence, due to progress in design and progress in equipment, will materially affect product cost.

Take the case of increases in costs due to discomfort of personnel: Comfort air conditioning is important in any plant. Controlled temperature and humidity conditions, adequate air circulation and distribution, ventilation and air cleaning create a working atmosphere that will enable employees to produce at a high level of efficiency regardless of outside weather conditions.

Air conditioning in office and production areas results in a more profitable utilization of production facilities. Employee health, morale, efficiency and productive capacity are increased. In addition, with more comfortable and healthier working conditions, it is easier to attract and hold desirable personnel, with corresponding reduction in labor turnover and training expense.

Air-conditioning economics

Comfort air conditioning is not an expense but a money-making investment, since, in addition to the benefits stated before, poor workmanship and errors directly attributable to high or low temperatures and humidities are eliminated.

It should be looked upon as merely an extension of the problem of heating and ventilating buildings. It extends the comfort season throughout the year.

The modern air-conditioning system can be made as elaborate as the demands for refinement require, combined with the economics involved. This is where the engineer's common sense and judgment are brought into play after weighing all factors in-

Continued on page 70

New pump vs. old pump savings chart

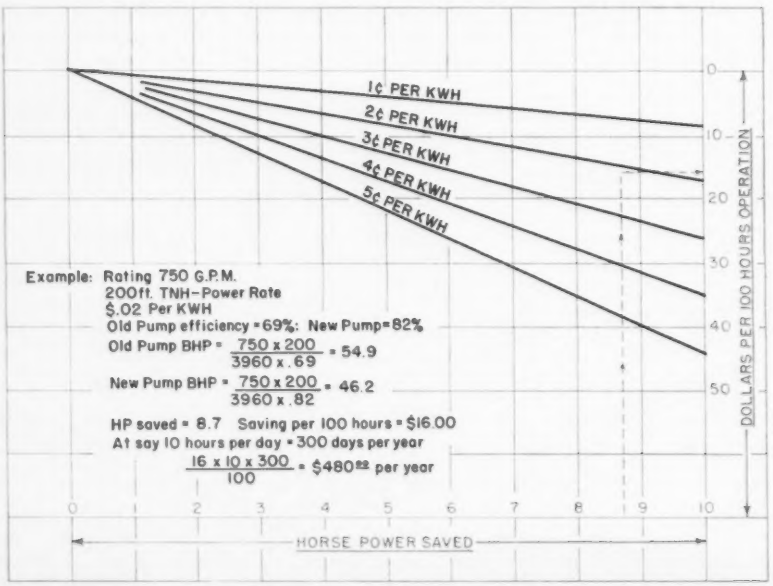
SAVINGS you can make by replacing an old, inefficient pump with a new, efficient unit are shown in the chart below.

The figures are approximate, as an average motor efficiency of 85% is assumed, and power factor and demand charge are not considered. The curve will, however, indicate to what extent a new pump will be an advantage in any installation.

Quite often the new pump will pay for itself in a few months from the savings and provide the customer clear gain thereafter.

To use chart:

1. Calculate brake horsepower of old pump and a new pump. (Brake horsepower means gallons per minute times total head in feet; divided by pump efficiency expressed as a decimal.)
2. Read up from "Hp. saved" line (i.e., difference between old and new pump hp.) to line marked nearest electric current rate.
3. Then read across to the right for dollars saved. This is per 100 hours, from which savings for any period can be figured.


1¢ PER KWH
2¢ PER KWH
3¢ PER KWH
4¢ PER KWH
5¢ PER KWH
0
10
20
30
40
50
DOLLARS PER 100 HOURS OPERATION
Example: Rating 750 G.P.M.
200ft. TNH–Power Rate
$.02 Per KWH
Old Pump efficiency = 69%: New Pump = 82%
Old Pump BHP = 750 x 200 / 3960 x .69 = 54.9
New Pump BHP = 750 x 200 / 3960 x .82 = 46.2
HP saved = 8.7 Saving per 100 hours = $16.00
At say 10 hours per day = 300 days per year
16 x 10 x 300 / 100 = $480.00 per year
0 1 2 3 4 5 6 7 8 9 10
HORSE POWER SAVED

DOWN GOES DOWN-TIME with Permanente 84!

In this report from a major steel mill you'll find convincing evidence that you can drastically reduce down-time for hot repair with Permanente 84—the West's largest selling ramming and patching mix.

"Open hearths are operating well under usual heat times. Last month, heat time from tap to tap averaged seven minutes less than the previous best month on record. The use of Permanente 84 has helped cut delay time in half!"

Faster hot repair is possible with Permanente 84 because it's easy to use. Fewer repairs are needed between heats because it gives superior bottom performance.

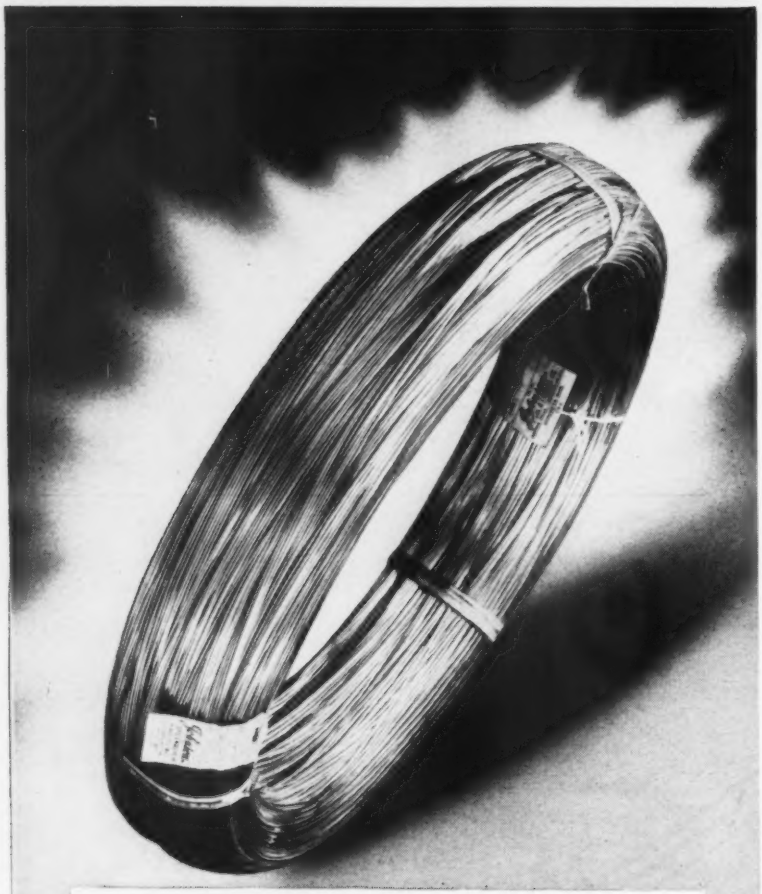
Start using Permanente 84 now for open hearth and electric furnace rebuilds as well as for bottom, bank and tap hole maintenance. It has set the standard for western industry for more than 10 years.

SEND FOR BOOKLET giving all the important advantages of Permanente 84 and the companion material, Permanente 165. Upon request, your Kaiser refractory engineer will promptly offer you research, design and installation service to help you obtain more steel tonnage per year, at lower bottom cost per ton. Call or write principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase



High Quality High Carbon Wires

If you are not afraid to face the music,
you may some day lead the band.

And, this reminds us that Music Wire, although originally named because of its use in producing musical tones, is used today far more extensively for other purposes. Johnson Music Wire is high grade, high carbon wire, and we can claim, even though you may think not modestly, that our music spring wire is the highest quality you can obtain, and ideal for thousands of uses.

JOHNSON

JOHNSON STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

A SUBSIDIARY OF PITTSBURGH STEEL COMPANY

OBSOLETE EQUIPMENT

. . . Continued from page 68

volved. I would say that an air-conditioning system is only as good as its mechanical heating and cooling equipment, air distribution, controls and zoning.

Older installations of air-conditioning systems have or are becoming obsolete as time progresses, for several reasons: (1) Excessive long duct runs result in uneven temperatures; (2) Refrigeration machines may be of an obsolete type with no controls for capacity reduction; (3) System load factors have changed, due to added personnel and equipment heat loads, with the result that the plant may not be capable of handling these added loads.

Haphazard piping

Other points of "creeping obsolescence" and a lowering of profits can be the result of not taking advantage of increased efficiency and consequent lower operating costs of more modern equipment or design.

For example, efficient piping systems have an important influence on the operating economy of any plant. Many industries recognize this fact and make every effort to properly plan, correctly install and adequately maintain their piping systems.

There are, however, other plants where poor layouts are in use that are detrimental to efficiency. For example, haphazard piping extensions, which ultimately cause an overload condition, may have been added over an extended period of time.

Overloaded steam lines

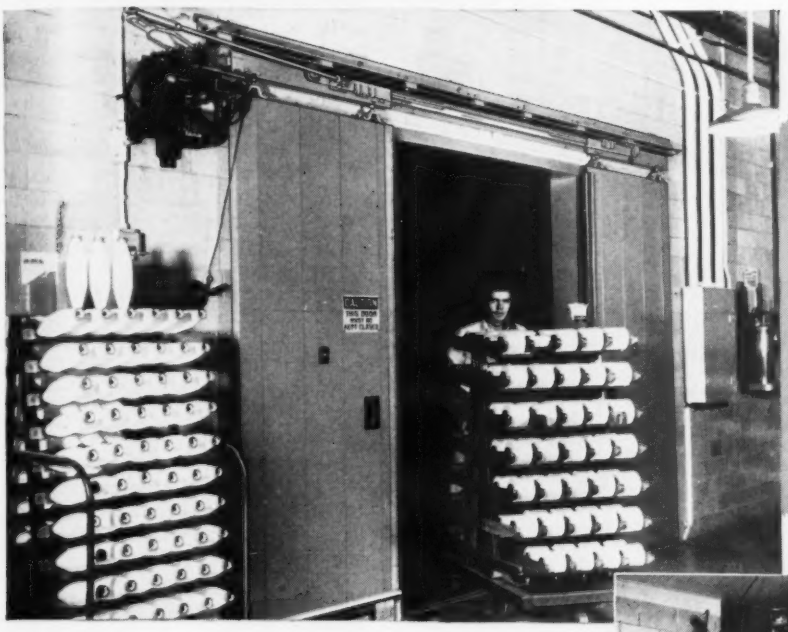
More often than not, little care is exercised when connecting additional plant equipment, and this may cause trouble. For example, the number of steam-consuming machines connected to the original steam mains may be doubled with consequent higher pressure loss and steam starvation.

Consider pumps for a moment: Great improvements have been made in pumps, particularly the centrifugal types, during the past 10 to 15 years. These improvements are so outstanding that they make it economical to replace old pumps with new ones in many installations. Comparison of efficiency of old and new centrifugal pumps shows that power-saving possible will soon pay for the new units.

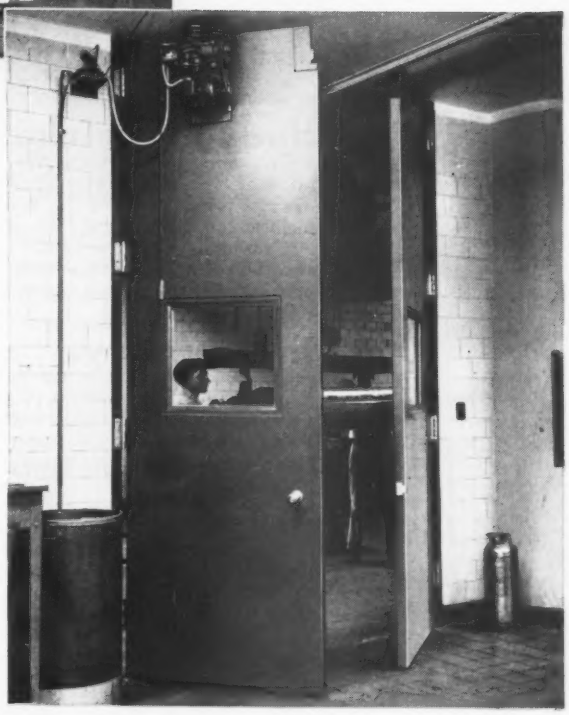
Take the example of a six-inch single-stage, double-suction centrifugal pump supplied by one manufacturer as standard equipment ten years ago as

Concluded on page 72

Richards-Wilcox Automatic Door Operators



Smoother! Safer! More Efficient!



Electronic time-savers for industry

No. 1512 Aut-O-Dor Operator for sliding doors. One operator, No. 1512, can be adapted to bi-parting doors, as shown above, by the addition of a cable attachment for door, not connected to unit. Designed for smaller openings where a pair of sliding doors or a single sliding door is most practical, with maximum opening of 5 feet for single door and 10 feet for bi-parting doors. Supplied in ¼, ⅓, or ½ HP units; single or polyphase AC with overload and underload protection.

No. 1508 Aut-O-Dor Operators for pairs of swinging doors. For low-cost, automatic operation of a pair of swinging doors, the 1508 single operator mounts on one door, but smoothly activates both by a simple mechanical linkage. Standard units have either a cable switch or push button control. Activation by radio, magnets or unseen light beam is optional equipment. Operation from inverted installation on lintel above door may also be obtained. Supplied in ¼, ⅓ and ½ HP units for openings up to 12 feet wide. Operator may be single phase or polyphase AC, overload protection is provided. Doors may be stopped at any point during operation and direction reversed.

Stop by our booths, No. 1552 and 1556 at the Materials Handling Show in Philadelphia.

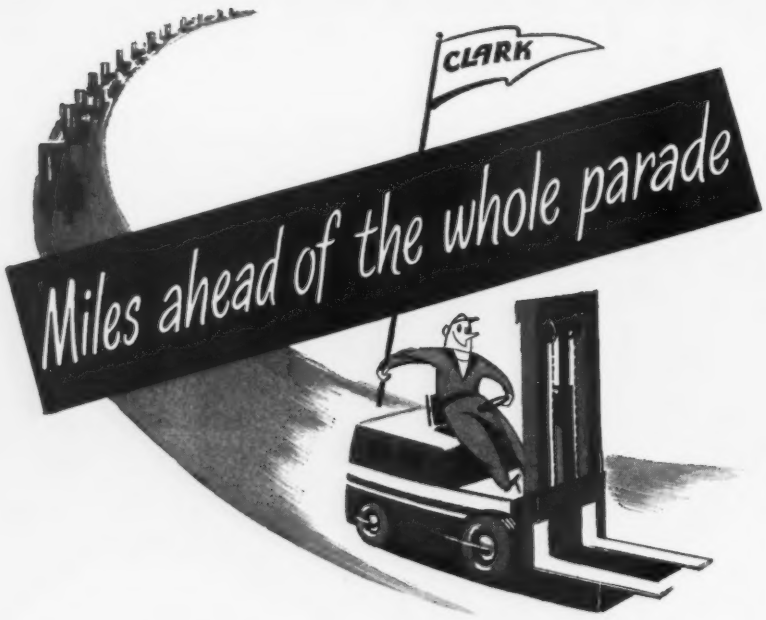
Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

Branch Offices: **909 Santa Fe Ave., Los Angeles 21**
Builders Exchange Bldg., 666 Mission St., San Francisco • 6903 57th N.E., Seattle 5

1880 — RICHARDS WILCOX — R W — AURORA — TRADE MARK — Reg. U. S. Pat. Off. — 1953

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS • ELEVATOR DOOR OPERATING EQUIPMENT



in efficiency...
No matter what your product may be, Clark Equipment can lift it, move it, load it or stack it better, faster, and at lower cost. That's saying a lot . . . but ask any Clark user. He'll tell you Clark is miles ahead of the whole parade.

CLARK MATERIALS HANDLING EQUIPMENT

through usefulness...
There's no end to the usefulness of the Clark line of fork-lift trucks, powered hand trucks and industrial towing tractors . . . special attachments facilitate quick switching from one job to another . . . no idling while "waiting for work" . . . odd sizes and shapes handled easily and safely . . . your choice of power types—gas, diesel or electric battery.

in economy... Clark Equipment saves time . . . multiplies manpower . . . reduces handling time. Clark high-tiering increases usable warehouse space . . . cuts storage costs. And the many important Clark features plus Clark precision engineering insure remarkably low operating costs.

in service... Clark Equipment gives service . . . years of it. But remember, the equipment that *gives the most* service is that which *gets the best* service. That's why you'll always find a Clark Service Dealer near you capable of handling the most complex repair or overhaul job . . . with a line of genuine Clark replacement parts . . . and a crew of factory-trained experts to serve you . . . promptly.

Note carefully the eleven locations shown below. Pick the one nearest you . . . and call on Clark.

ROBERT H. BRAUN COMPANY • Los Angeles 22, California
Fresno, San Diego, Bakersfield • Phoenix, Arizona
GLEN L. CODMAN COMPANY, INC. • Oakland 3, California
PRESTON FALLER COMPANY • Seattle, Washington • Portland 9, Oregon
Spokane, Washington • Eugene, Oregon
ALBERT J. ISAACSEN, INC. • Salt Lake City, Utah

OBSOLETE EQUIPMENT

. . . Continued from page 70

compared to a modern pump of same manufacture for similar conditions.

Rating each pump at 1,300 gpm. against a 200-ft. head when operating at 1,750 rpm., the old pump has an efficiency of 73% and requires 90.3 hp. to drive it.

The new pump gives efficiency of 84% and requires 78.5 hp. This is 11% increase in efficiency with a 13% reduction in power, or a power saving of 8.85 kw-hr. for each hour that the new pump operates.

Assuming power cost of 1¢/kw-hr., and 3,000 hr. operation per year, saving in power cost is $265.50. Estimating the cost of new pump at $750.00, it will pay for itself in less than three years.

Modern pumps are more readily serviced than early designs. This increases their reliability. A pump easily taken apart for inspection is more likely to be kept in good condition than one difficult to get into.

Whenever old pumps require extensive repairs, careful consideration should be given to replacement. The cost is a credit if a new pump is purchased, which achieves better performance and lower operating costs.

Probably no piece of equipment in a plant offers greater possibilities for return on its investment than does replacing an old pump with a new one. Operating engineers may point with pride to the old pump that has seen service for 20 years and still gives a good account of itself. As a sound business proposition, however, it may be far more economical to junk the old pump and install a new one.

APPRENTICE TRAINING conference at San Diego

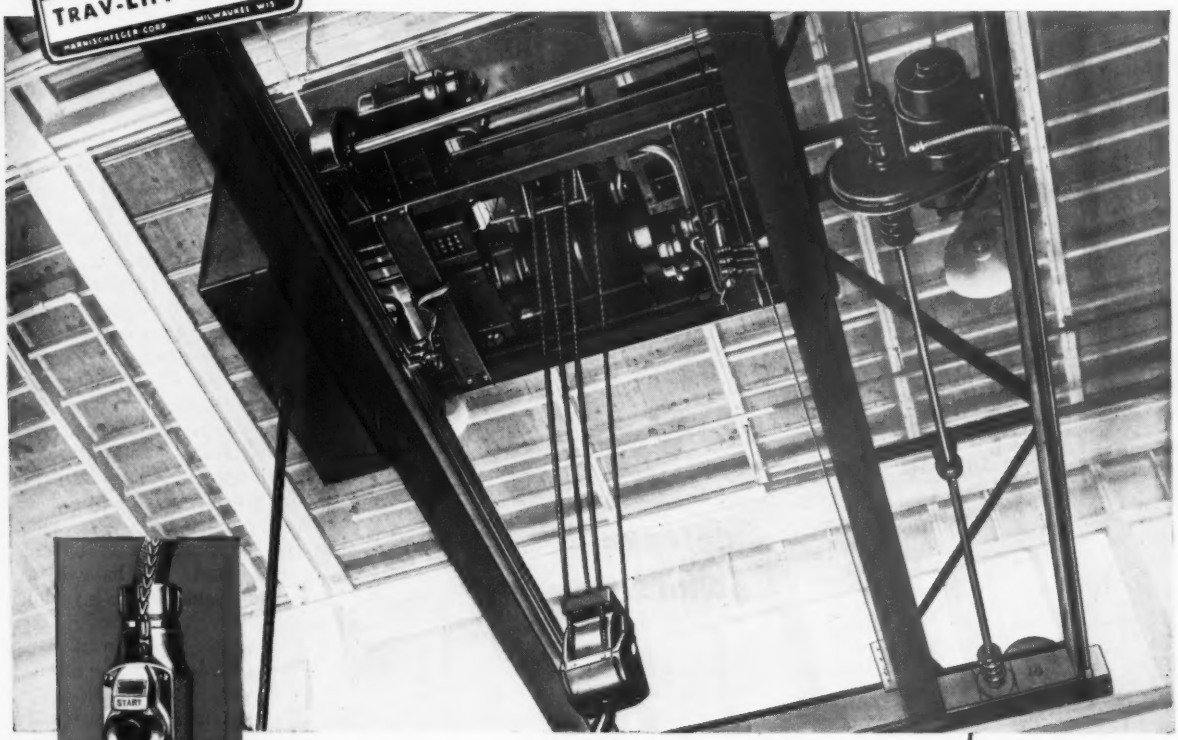
BIGGEST conference of its kind ever called is the advance report on the First North American Conference on Apprenticeship, which will be held at Balboa Park, San Diego, August 2 to 9.

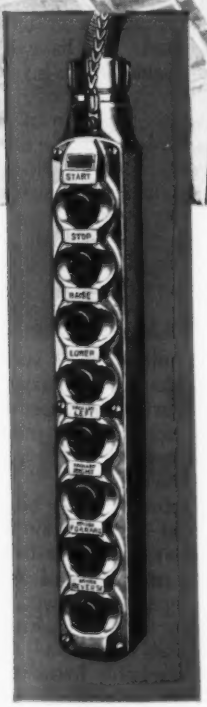
Representatives from each of the 48 states and Hawaii have been invited to attend, and representatives from the Dominion of Canada and the Republic of Mexico have given assurances that they will have conferees in attendance.

Its purpose is to provide aid and encouragement to the apprenticeship programs which develop the skilled journeymen of tomorrow. The management coordinator for the conference is Robert C. Girard, California Metal Trades Association, 1706 Broadway, Oakland. Further details will appear in the July issue of *Western Industry*.

P&H
TRAV-LIFT CRANES
HARNISCHFEGER CORP MILWAUKEE WIS

What do You have to handle?





● Whatever it is, make the job easier and faster with the P&H Trav-Lift Cranes. Serve an entire bay with "thru-the-air" handling over congested floors. No out-of-reach spots! No rehandling. One man lifts, transports, and stores loads up to 15 tons by pressing buttons.

You save money, too, when you choose a P&H Trav-Lift. Your initial investment is lower because Trav-Lift Cranes are custom-made to your needs from standard money-saving designs. This means tailor-made service at "stock" prices.

The P&H Trav-Lift is built to meet a variety of needs . . . with either cage or floor control . . . with suitable spans and lifting speeds . . . in capacities up to 15 tons. Call P&H for expert assistance with your handling problems. Write for booklet H-13-1.

handle it "thru-the-air" at lower cost

P&H PACIFIC DIVISION
HARNISCHFEGER CORPORATION

Plant, District Office and Warehouse
2400 East Imperial Highway, Los Angeles 59, Calif.

HI NEIGHBOR!

P&H Trav-Lift Cranes are made *in* the West, *for* the West. When parts or service are needed, remember, we're neighbors. Drop in and see our new Pacific Division headquarters — the West's most modern crane factory. You'll get fast, experienced help with your problems.

San Francisco, 100 Bush Street • Seattle, 2909 First Avenue, South • Denver, Room 415, Central Bank Building, 1108-15th Street

BUDGET CONTROL COSTS

GEORGE O. CARLSON
Resident Partner, Los Angeles
Ernst & Ernst
Accountants and Auditors

MY OBSERVATION is that engineers and architects are quite accustomed to advance estimating of construction costs and later comparison of actual costs with those estimated. This is the essence of budgeting.

If cost comparisons are to be something more than post-mortems, they must be made available while the work is going on, so that management will become aware of what is happening while there is still time to apply corrective action.

Any sort of budgeting is beneficial, but if its real potential is to be realized, an approach must be adopted which is radically different from that commonly employed. Budget estimates and subsequent reporting must deal primarily with small items.

To illustrate what I mean by this, let us suppose we are undertaking to forecast future sales. If we merely estimate what the total sales are going to be, benefits are likely to be limited.

To be really useful, the forecast must be broken down to show how many units of each size or grade or other variation of each commodity will be sold in each territory in each month or other accounting period and at what price. The more minute and detailed the sales forecast is the more readily departments can plan their operations.

If in early periods the sales vary as to type or classification from the advance estimates that were made, the estimated requirements for subsequent periods can be adjusted so as to minimize the accumulation of unneeded materials or parts. We have all seen plenty of instances where inventories were clogged with slow moving items which take a long time to work off and some of which may never be sold.

I don't claim that scientific budgeting will eliminate all such factors, but I do say that it will effect enough savings to make budgeting a highly profitable procedure, even though on the surface it looks expensive.

Applies to construction

Another requirement for successful budgeting is that the estimates must be made by or with the cooperation of the persons responsible for producing the result or controlling the contemplated operation or cost.

Once the estimates have been prepared, the next consideration is that the information about the budgeted operations be prepared and recorded in a form comparable in every detail with the advance estimates. Estimates for future periods must be adjusted at regular and reasonably frequent intervals so that they will reflect knowledge gained from recent experience.

What I have said applies principally to budgeting for commercial or manufacturing operations, but the same principles are to some extent applicable to construction projects.

If unfavorable trends are made known early enough it is sometimes possible to adopt alternatives or adopt corrective measures which will save the day, even in construction projects where repetitive operations are less sustained than in manufacturing.

NORGREN cuts compressed air costs!

saves maintenance dollars!

...simply by using Norgren Pressure Regulators to reduce air line pressures to the working pressures specified by air equipment manufacturers.

HERE'S HOW . . .

a ¼" air screwdriver, for example, with a recommended working pressure of 80 psi. is operated at main line pressure of 110 psi.

This means:

30 psi. excessive and wasted pressure, causing increased wear on parts and increasing maintenance costs.

COMPRESSED AIR WASTE:
at 110 psi. a ¼" screwdriver uses ..... 18.5 cfm.
at 80 psi. a ¼" screwdriver uses ..... 13.5 cfm.
Air waste per minute 5.0 cubic feet

If the tool is used 50% of the time each 8-hour day you are wasting 316,800 cu. ft. of air a year.

If your cost of compressed air, using reciprocating compressors, is approximately 18c per thousand cu. ft. your loss would amount to $57.02 per year per tool.

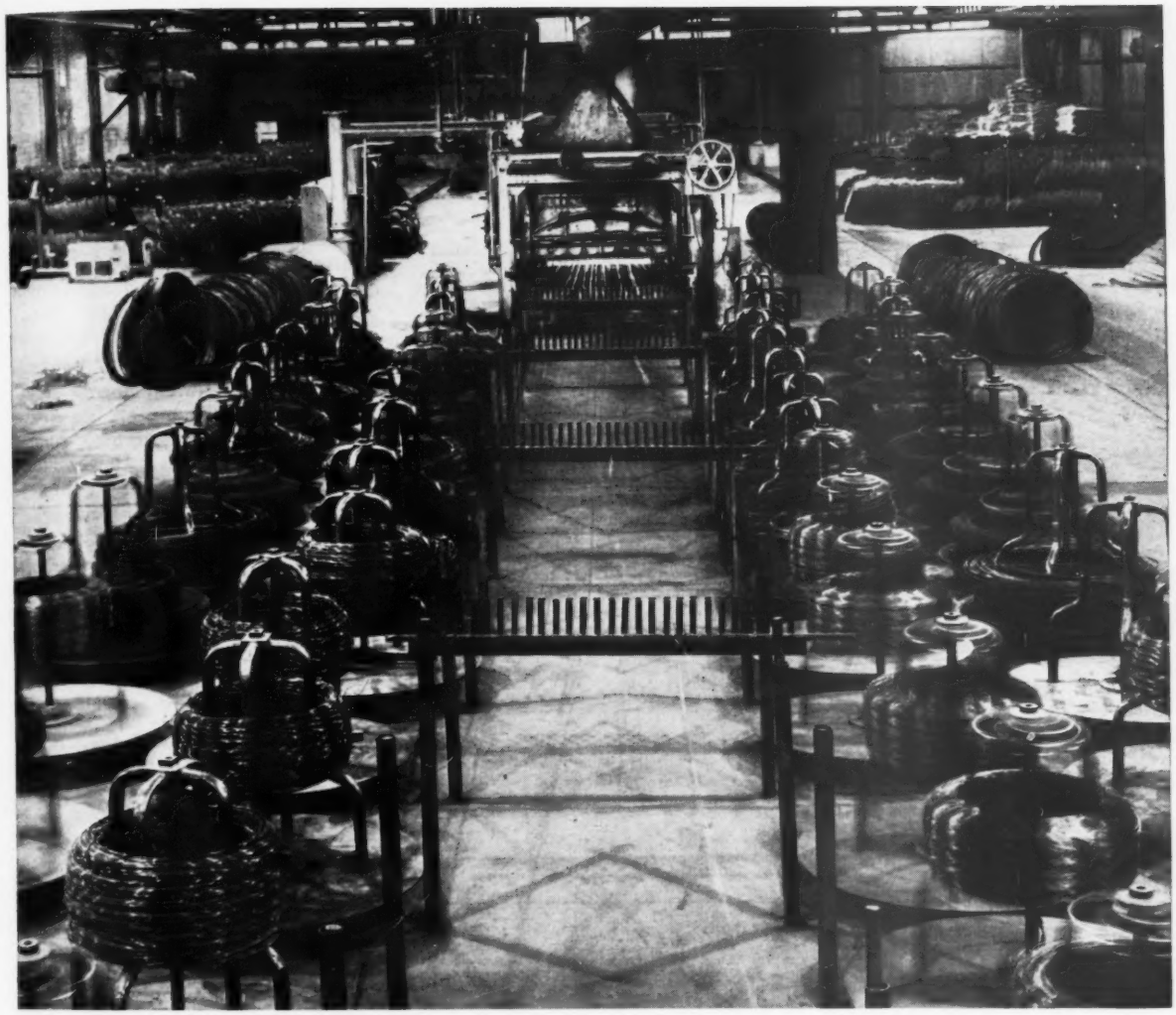
Using ten air screwdrivers under these conditions means you are losing $570.20 per year in addition to paying higher equipment maintenance costs and getting shorter equipment life.

For Only $9.20 YOU CAN STOP THESE LOSSES WITH A NORGREN REGULATOR

WRITE, NOW, FOR CATALOG SHEET ON NORGREN REGULATORS

C. A. Norgren CO.
3433 So. Elati St., Englewood, Colorado

• VALVES • FILTERS • REGULATORS • LUBRICATORS • HOSE ASSEMBLIES
PIONEER AND LEADER IN OIL-FOG LUBRICATION FOR 25 YEARS



MANUFACTURERS' WIRE
Made to Order for Industrial Uses

Shown here is an important piece of equipment used in the production of manufacturers' wire at Bethlehem Pacific's Los Angeles plant. It is a patenting furnace. And it is only one of the many different machines and furnaces needed to turn out a variety of wire.

Almost any steel wire application you can mention calls for a particular type and grade, made to an individual specification.

Among the various types this company makes for Southern California manufacturers are: Bright wire for coat hangers and fencing . . . Annealed-in-process wire for screws and rivets . . . Patented high-carbon wire for wire rope, automotive and upholstery springs . . . Tire bead wire for automobile tires.

At Bethlehem Pacific's Los Angeles plant wiremaking operations are coordinated with steelmaking to insure steady production, and to help maintain uniformity of the finished wire.

The latest types of rod-cleaning equipment, wire-drawing machines, and annealing and patenting furnaces are arranged in production-line sequence. High-quality steel is supplied by electric-arc steelmaking furnaces and a high-speed rod mill in adjacent departments of the plant.

We welcome your inquiries about wire, its applications and uses. Write or phone.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Office and Wire Mill:
3391 E. Randolph St., Vernon

BETHLEHEM STEEL

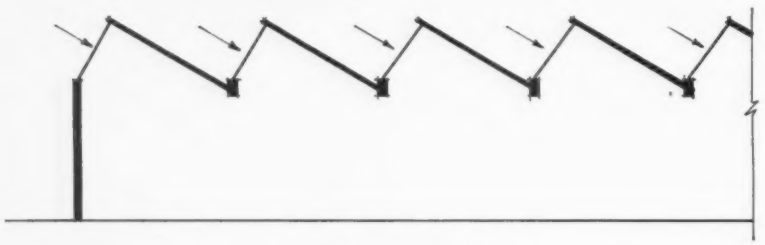
BETHLEHEM PACIFIC

BE YOUR OWN ANSWER MAN

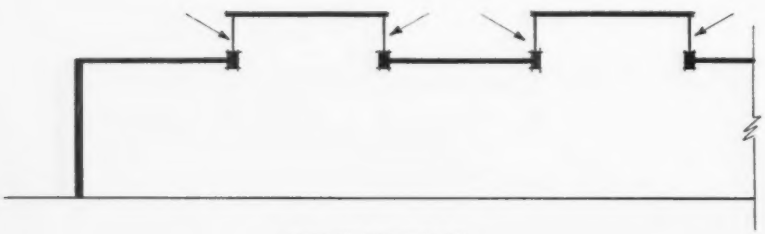
Use this questionnaire to decide whether to rebuild, remodel, extend, or start new

GEORGE B. ALLISON
Allison and Rible, Architects
Los Angeles

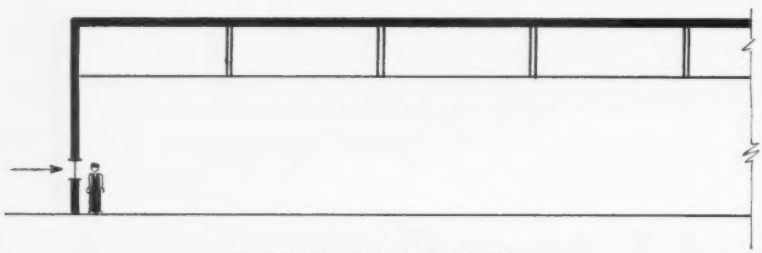
ALTERNATE treatments for natural interior lighting for plant interiors. Sawtooth daylight (top) needs some supplementing with artificial lighting. Monitor roof (center) which permits easier control of directional light at task levels. The vision strip windows design illustrated at bottom is intended to combat worker claustrophobia. First two types are costly to install and maintain.



SAWTOOTH SKYLIGHT



MONITOR ROOF



VISION STRIP WINDOWS

1 IS IT BETTER economy in the long view to: (a) try to rebuild or remodel your old plant; (b) leave it as it is but extend it by means of a modern up-to-date addition, or (c) tear down the shack, remove it, and start all over again from scratch?

2 Saw-tooth and monitor top-lighting and skylights are expensive both in initial and in maintenance costs. Therefore, is it better economy in the long view, in the lower annual cost point of view, to: (a) build saw-tooth skylights with fixed sash supplemented by some artificial lighting with a simple system of ventilation, or (b) use monitors instead of skylights because of their easier control of directional light at task level, or (c) use only vision strip windows at eye level to combat claustrophobia on the part of the worker, or (d) develop a windowless design relying entirely on controlled artificial lighting and transfer the cost of that natural overhead lighting to installing a better ventilating system?

3 From the point of view of the economist, what is the maximum percentage of total costs of annual plant production that should limit a dollar-capital outlay for plant building or plant modernization? Where is the dividing line between providing bare necessities and providing good working conditions, and how is this division related to annual production costs?

4 Your company's books may list valuable units of equipment which are actually obsolete from a competitive point of view; therefore, they are negative producers when compared with newer units which would produce far more per annum. At what dividing line do these units become liabilities rather than assets?

5 What is the maximum economic distance for an employee to walk from a working area to a toilet facility?

6 In rapidly changing times, how far should you standardize and stockpile for replacement? And to what extent should modular design control your planning?

* * *

HERE IS an instance of what happened after a recent production-machinery modernization program in an industry with which we had con-

Concluded on page 78

THERE'S PROFIT In Buying For Value!

Fruehauf Truck Bodies Give You...

Custom Features . . . Unexcelled Quality . . .
More Economical Hauling . . . All At *Low* Cost!

In the truck body field the name "Fruehauf" has become synonymous with "top quality." Fruehauf Truck Bodies also give you the advantage of low price, because they're "Unit-Built"—precision-engineered by the leader in the industry, and skillfully and speedily assembled, mounted and painted for no extra cost at your nearby Fruehauf Branch Factory. Fruehauf Truck Bodies are available with a choice of more than 500 body types and optional features. For low price, top quality, and widest choice — choose Fruehauf. See your local truck dealer or nearest Fruehauf Branch for details of the *value line* in modern trucking.

FRUEHAUF
"UNIT-BUILT"
Truck Bodies

World's Largest Builder of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plants, Los Angeles and Seattle

SALES AND SERVICE: Los Angeles • San Francisco-Oakland Portland • Seattle • Fresno • Sacramento • Spokane Billings • Salt Lake City • Boise • Phoenix • Albuquerque El Paso • Denver

BE YOUR OWN ANSWER MAN

. . . Continued from page 76

tacts. Using the "before and after" basis for comparison, we find that the annual manufactured product increased about 60% after, while the number of employees required to produce it was reduced by one-third.

In other words, 66% of the "before" number of employees produced 160% of the "before" product. At the same time wage rates were allowed to edge upward insofar as then existing government regulations permitted. This company is continuing its program, now concentrating on better facilities for the machine operator.

An adaptable plant is easily converted from peace-time to wartime production, and is a more salable article when the time comes to sell. In modernizing structures with floors, walls and roofs, we aim for adequate bay sizes, adequate height, and a clean articulated floor plant. Then we anticipate facilities to minimize worker fatigue. Amazing results can be achieved, for instance, in the changing of the lighting within an industrial plant from a few footcandles at task level to qualities which are comfortable and stimulating.

Increase productivity

We are told that carefully engineered ventilation, dust control, filtration of atmospheric pollution, all increase worker productivity. Not only the worker's eyes and his nose can be eased of the burden of fatigue but likewise his other senses, his hearing, wear and tear on his feet and on his hands, and the surrounding temperatures which affect his bodily comfort.

The noted Detroit industrial architect, Albert Kahn, emphasized the dictum that the client's analysis of the problem is the first step toward its solution.

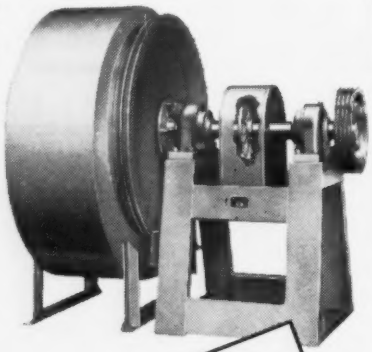
Kahn's factory construction programs included functional design and flexibility. His idea was that the plant should provide for straight-line activity, various departments for successive operations located to effect direct production flow so that transportation and material handling would be minimized. There should be no crossing or retracing of the production line with consequent congestion, and to this should be added provision for handling emergencies in case of a slow-down or a breakdown during the production process.

Flexibility to Kahn meant that departmental layouts be sufficiently elastic to permit re-arrangement resulting from changes in production methods and changes in departments without disorganizing the existing scheme.

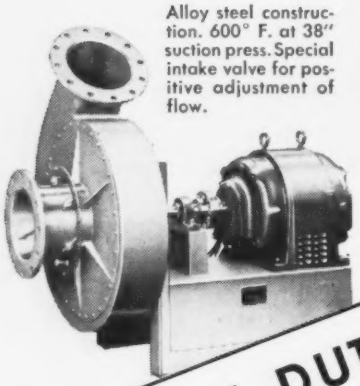
In addition to the functional design, equally important criteria dealt with business-like execution. After the scheme was established, a preliminary cost estimate was developed sufficiently accurate to obviate extensive overrunning of the budget.

Under today's fluctuating building market, this is particularly difficult to control and it demands close collaboration of those who are in a position to know what they are talking about.

All stainless-steel for operation at 1200° F. Fully insulated removable plug door. Housing insulated after installation.



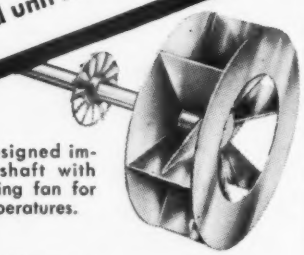
Alloy steel construction. 600° F. at 38" suction press. Special intake valve for positive adjustment of flow.



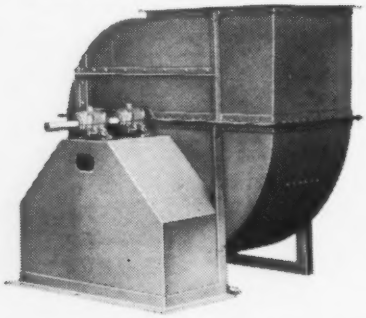
SPECIAL DUTY BLOWERS

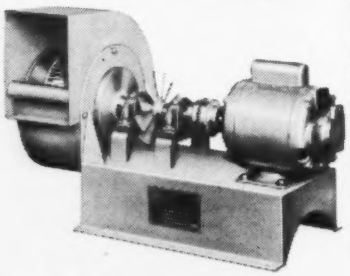
Yes...MASTER FAN CORP. can design a special blower to meet your needs if a standard unit is not applicable.

Specially designed impeller and shaft with bearing cooling fan for elevated temperatures.



For exhaust of corrosive fumes, this blower is constructed of acid-resisting alloys. Note seal around shaft where it enters housing.





A little Cyclone, specially designed to circulate hot gases around work in a furnace or annealing oven.

MASTER FAN CORP.

1323 Channing St., Los Angeles 21, Calif. VA 1037

GOTTA HAVE spark plugs

NO MENTION of the Institute on Industrial Plant Design would be complete, or even adequate, without recognition of the part played by Earle V. Grover, president of Apex Steel Corporation, Los Angeles, in pepping up the sessions.

He acted as general chairman of the Institute, in addition to being the presiding officer at the meetings.

Pays For Itself In 13 Weeks

Lumber-Handling Crane

It did not take long for a Cleveland Tramrail crane to pay for itself at the Acme Box Company, Inc., Baltimore, Maryland, an important manufacturer of various type boxes specializing in beverage cases. In fact, in just 13 weeks the entire cost of crane, runways and erection was absorbed because of the efficiency that was introduced in the handling of lumber.

Some 10,000 to 12,000 feet of rough lumber, 12 feet in length, is handled per 10 hour day. The crane places the lumber on the saw table from which it is run through the saws. It is here that more than 80 hours of time are saved per week because a large load of lumber is handled to the table at one time whereas formerly it was handled singly, board by board.

The grab has chains suspended from each of its four corners. Lumber is carried by two load bars which are threaded into the chain links. Although 500 feet can be handled at a time, the illustration shows the grab with a half load.

The crane is hand-propelled and of one ton capacity. The hand-propelled trolley has a double-drum electric hoist with two hooks each having ½ ton capacity.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
8839 EAST 284TH STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

In Every Department

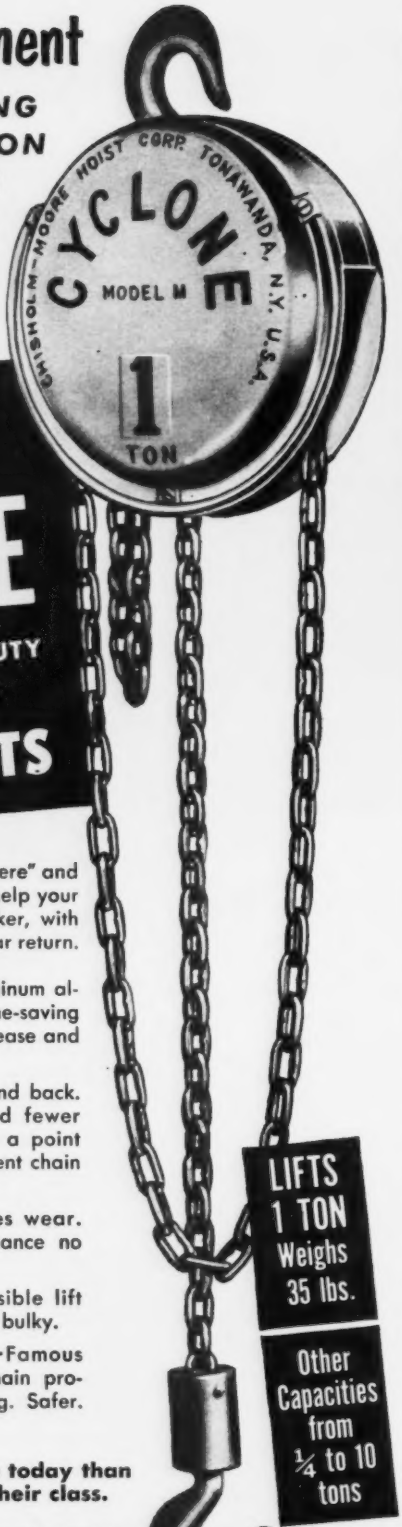
RECEIVING
PRODUCTION
STOCKROOM
MAINTENANCE
SHIPPING

do the lifting with

CM CYCLONE

HIGH SPEED—HEAVY DUTY
ALUMINUM ALLOY

CHAIN HOISTS



HERE ARE ONLY 5 PLACES "where" and 5 reasons "why" CYCLONE Hoists can help your men get lifting jobs done safer, quicker, with less physical effort. Increase labor-dollar return.

PORTABLE—The lightest weight aluminum alloy hoist in America. Encourages time-saving use because it can be picked up with ease and carried anywhere.

EASY OPERATION—Saves muscle and back. Advanced construction features and fewer parts combine to reduce friction to a point where the CYCLONE is the most efficient chain hoist available.

LIFETIME LUBRICATION—Reduces wear. Prolongs hoist life. Efficient performance no longer depends on periodic oiling.

LOW HEAD ROOM—Highest possible lift where ceilings are low and loads are bulky.

"HERC-ALLOY" LOAD CHAIN—Famous "HERC-ALLOY" welded steel load chain provides complete flexibility. Non-kinking. Safer. Longer life.

More CYCLONE Hoists are in use today than any other aluminum hoist in their class.

BULLETIN No. 145 illustrates, describes and prices all CYCLONE Chain Hoist models. Copy sent on request.

CHISHOLM-MOORE HOIST CORPORATION

(Affiliated with Columbus McKinnon Chain Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: New York, Chicago and Cleveland • Distributors Everywhere

GRAIN UNLOADING time cut three-fourths

Three operations in one. Vehicle drives on platform, full load is weighed, platform tilts to dump load, then tare weight taken

WITH A NEW lift installed for General Mills, Inc., at Ogden, Utah, and Vallejo, Calif., a truck and trailer of grain can be unloaded in about 15 minutes, or approximately a quarter the time formerly required. This simplified mechanical principle of grain handling requires a minimum of maintenance, and does the work formerly performed manually by two unloaders.

The truck and trailer are driven onto a 60-ft. platform, mounted on a 50-ton Fairbanks-Morse truck scale, for full load weighing. A delicately suspended system of shackles frees the weight of the hoist cables during the weighing operations. The weighmaster, having noted the final weight, then sets chocks under the wheels, and the driver opens the tailgate of the truck. Both truck and trailer can be weighed, full, at the same time, but must be hoisted and dumped separately.

Next the weighmaster starts an electrical motor, located 40 ft. above on an overhead platform, which lifts the platform to a 35-deg. angle by means of cables and a drum. Grain is dumped into an underground hopper, adjacent to the scales, where a conveyor belt carries it to a bucket elevator. It is then lifted to the head house of the grain elevator where another conveyor belt carries it to the respective storage bins. After dumping the truck and trailer, the tare weight is determined. Both operations were installed under supervision of R. F. Marken, Monarch Supply Co.

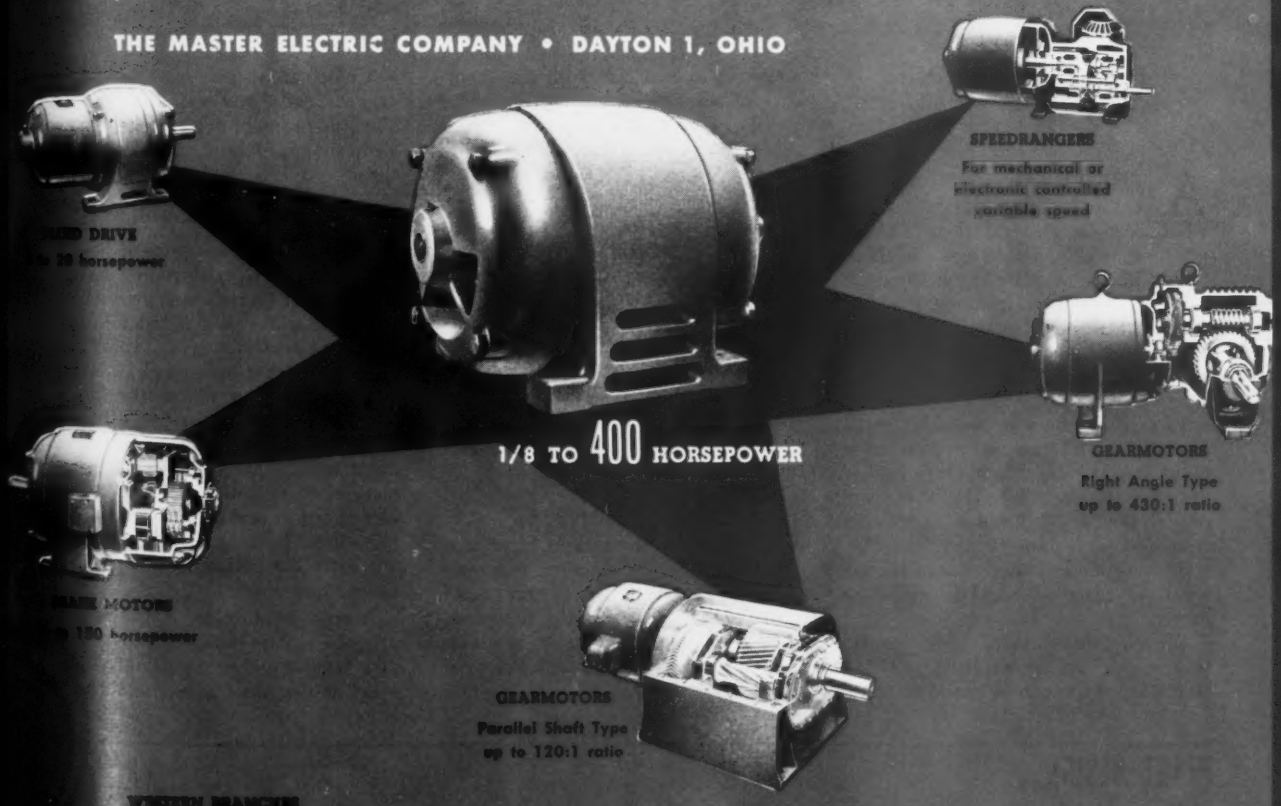
Whenever you select a power unit, don't put a straight-jacket on your ideas . . . consider ALL of the possibilities of modern power drives.

For example consider the many useful combinations that can be secured with the basic Master power units shown below. They're designed so they can be easily combined together to give you the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features in one compact unit that you can use RIGHT where you want it. Nowhere else will you find power units that are so flexible, so easily adaptable, and in such a wide range of types and ratings.

Master power drives are available in thousands and thousands of ratings (⅛ to 400 HP) . . . in open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 430 to 1 ratio . . . with electric brakes . . . with fluid-drive . . . with mechanical or electronic variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best power drive for YOU.

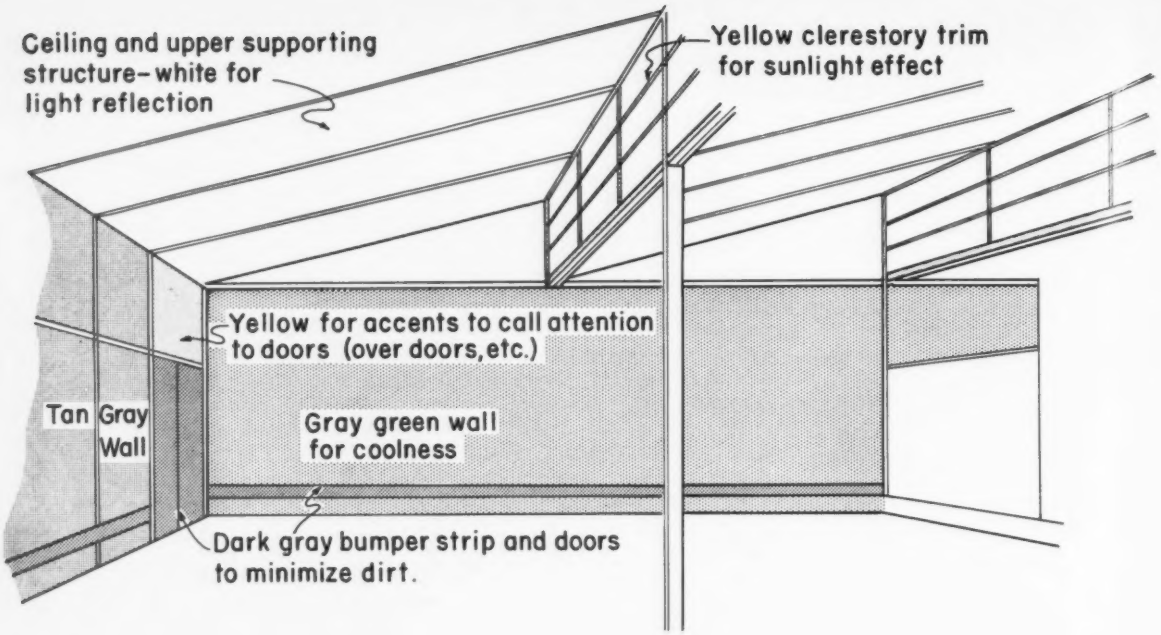
give your brains a chance

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



WESTERN BRANCHES

SALT LAKE CITY PORTLAND SPOKANE SEATTLE LOS ANGELES SAN FRANCIS


Ceiling and upper supporting structure–white for light reflection
Yellow clerestory trim for sunlight effect
Yellow for accents to call attention to doors (over doors, etc.)
Tan Gray Wall
Gray green wall for coolness
Dark gray bumper strip and doors to minimize dirt.

EFFECT OF APPEARANCE AND COLOR ON PRODUCTION

HARRY R. GREENE
Merendo Greene, Industrial Designer
Pasadena, California

AS THE FIELD of color and appearance in plant design is somewhat new, a great deal of "obsolescence" in color and design is in effect "built in," with little or no thought given to color or appearance.

The measure of success in the use of color should be in what it does to aid in the overall function of the business.

First, it can be a means of integrating both the interior and exterior of a plant into an organized unit. Buildings which have been built over a period of years and which have little consistency in appearance can be given a unified attractive appearance by an organized color and design treatment.

Within this organization many things can be accomplished. Areas which are warm can be made to seem cooler by use of colors on the "cool" end of the spectrum (greens, blue greens, etc.). The reverse effect can be achieved to "warm" up cool areas with "warm" colors (tans, beiges, etc.).

We have found other psychological effects of colors useful. In one plant where the only natural light was supplied by clerestory windows in a sawtooth roof, we were able through the use of soft green walls, white ceiling, and clear yellow trim around the windows, to achieve the effect of sunlight in the plant even on cloudy days. This is an effect which can have a direct effect on the attitude and efficiency of the employees.

Color coding useful

By means of color coding, pipes, machines, switches, or even entire assembly lines, can be traced or recognized immediately and easily. For the owner it shortens training time of new employees and increases efficiency of trained employees.

Color can also be used to code entrances, exits, and traffic routes. Here the orientation of new people is simplified, smoothed out, and hazards, reduced.

Reducing hazards

Machines and equipment can be painted so as to both reduce hazards and increase efficiency. When the bulk of the machine is painted a neutral color, the work stands out visually and is much easier to see and handle. Also, this neutral color allows the moving parts and switches to be painted in brighter colors which can be recognized quickly and easily. The same method of visibility by contrast can be applied in making important areas like signs, bulletin boards, entrances and exits, fire extinguishers and apparatus stand out.

A good job of color consulting can produce a plant which employees will take pride in and help to maintain, and which is a product advertisement.

MECHANIZATION NO CURE-ALL

Equipment must fit the individual problem

BENJAMIN BORCHARDT
Benjamin Borchardt and Associates
Management Consultants
Los Angeles

MECHANIZED HANDLING, in the minds of many people, has but one meaning—that is, a completely mechanized conveyor line. Following through on this line of logic, American industry has been successful; there has been progress beyond our fondest dreams.

Therefore, it is the mechanized conveyor that has done it all. Just purchase so many hundred feet of mechanized conveyor, be sure it runs all over your plant, and all production problems are over.

Be choosey

But a completely mechanized conveyor is not the cure-all for every manufacturing problem unless the operations themselves are completely mechanized. There are uses for all mechanized devices, but there are also places where all mechanized devices are not useful.

A *completely mechanized assembly conveyor* is specifically only one form or device of mechanized handling. A mechanized conveyor operating between operations is something different.

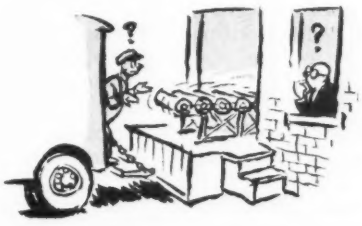
The advent of the fork-lift truck may not have been quite so spectacular as was the advent of the mechanized conveyor for assembly; however, it is playing just about as important a part in modern American industry. Most any manufacturing operation where material, parts or finished products, are moved or stored in quantity has a potential use for this device. The word "stored" was not used in connection with the mechanized conveyor.

Using the fork-lift truck in conjunction with pallets or platforms, your parts or products are readily moved in and out of a work station and in and out of temporary or permanent storage as a unit, requiring no stacking, restacking and unstacking operations, thus saving hours and hours of time, inconvenience and work slow-down or even work stoppage.

The amount of floor space saved through vertical storage possibilities when using fork-truck equipment is also substantial. Don't overlook this advantage; it may save you a great deal of money.

This specific type of equipment is good, without question, but, even here, it is not necessarily the equipment for *your* plant. These things *must* be tailored to the individual problem—there is no universal answer. For purpose of discussion, it matters not whether we use an overhead conveyor, a power-driven belt, roller conveyor, or what-have-you.

Selection depends on your product and operations. Whether the part hangs from a conveyor or is placed on a conveyor is not at all important so far as this discussion is concerned. The important point is that the part moves relentlessly along the conveyor and cannot be stopped unless the entire conveyor is stopped or production otherwise disrupted. Here we have the little problem that isn't really so small.



There may be not only a flow slowdown, but also a flow stoppage. There may be far poorer utilization of labor than would be the case if the flow were not *completely* mechanized.

The theory, of course, is that the work load at each work station is perfectly balanced against the work load at each other station. That is, there is exactly the same amount of work to be performed at each station.

Problem No. 1: We have a bottleneck. The longest job on the line sets the pace. For all other jobs on the line, we then have incomplete labor utilization. In other words, we have workers' time that is not entirely translated into effective effort. There is not enough work to keep each person on the line completely occupied and that spells *excess labor cost*.

The tendency may be, at least it has happened, to load the one or more bottleneck jobs too heavily—that is, require more than a normal day's work from one or several workers in order to obtain a normal day's work from the larger balance of the group. This is a good way to start labor trouble or have the union tell you how fast to run your conveyor.

The human factor

Then there is another trouble spot. No matter how well balanced are the operations on the line, in theory, there is still the human factor with which to contend.

Suppose there are one or more inexperienced workers on the line, that someone just doesn't feel so well on a certain day, that there is a flu epidemic and 20, 30 or 40% of the workers on the line do not show up for work. Suppose that just one little part supposed to meet the assembly line at a certain station doesn't get there on schedule. We probably just shut down the entire operation. In most cases the answer may be *partially*.

A mechanized device of some sort, to move material, parts, or finished product from one station to another is unquestionably the solution. You most likely may want a degree of mobility. You may want storage areas or "banks" along your line—if you are interested in complete labor utilization. Provision should be made to take parts from, or place parts on, the line at the will of the operator or supervisor without entailing unnecessary handling, and provision should be made so work is always available in sufficient quantities at each work station.

Any mechanical handling installation will be only as good as management's ability to prevent slow-downs and stoppages through proper selection, layout, engineering, scheduling, supervision and product design.

HAZARDOUS MATERIALS QUIZ

ANTHONY THORMIN, A.I.A., Architect, Los Angeles

SOME of the typical industrial occupancies which are subject to hazardous materials regulations include paint factories, flour and feed mills, grain elevators, wood-working establishments, soap and fat rendering plants, plastics goods manufacturing, electro-plating industries, cotton processing plants, fertilizer plants, metal products including foundries, cold storage plants using direct expansion system, and many other uses.

Many industrial uses include accessory operations involving materials, the use of which are subject to retroactive regulations. For example, various metal products industries require the use of flammable liquids such as paints and lacquers, lubricants, rust preventives, hydraulic oils, heat-treating oils, and cutting agents. Many of these materials can be confined to specially protected areas which offer reduced initial cost in plant construction by relieving the bulk of the plant from more restrictive code requirements.

When alterations to an existing industrial plant are planned and the use or storage of hazardous materials are involved, the plant management and architect might well ask themselves three questions:

1. Does the layout provide space for physical separation of hazardous operations and storage?

2. Can several of the operations subject to retroactive regulation be confined to a single portion of the plant and thus reduce costs? and,

3. What substitution of less hazardous materials or processes are practicable?

A fourth question is extremely important when additions or new buildings are contemplated. Can the more severely regulated operations be moved to the addition or new building which lends itself more readily to the integration of applicable requirements?

Example 1

A PROPOSED change in a synthetic rubber production process required the construction of a new structure to house the operation. After structural and mechanical plans had been prepared, it was learned that certain materials to be used and stored for the process were considered by interested agencies as constituting an extreme hazard. To provide reasonable compliance with applicable regulations, the entire program had to be re-studied with the result that all prior planning and drawings were discarded in favor of a newly developed and less hazardous process.

* * *

Example 2

ANOTHER company engaged in the production of livestock and poultry feeds had been operating near the break-even point because of creeping obsolescence. To provide more competitive production facilities, it was necessary to either construct new milling facilities, or completely re-equip the existing mill. Preliminary investigations indicated remodeling of the existing facilities as the more economical approach because of first cost and lease considerations.

He got stuck

On the basis of this investigation, the owner ordered new equipment to replace the obsolescent machinery. Certain modifications of the existing structure were necessary to provide footings and vertical clearances and plans were prepared for the changes. The interested enforcement agency refused a permit for the alterations until an agreement had been reached regarding a number of modifications of the building and mechanical installations not previously considered.

The additional cost of the modernization program would have provided a substantial basis for re-evaluation of the first alternate—new milling facilities. Prior equipment commitments had already made such re-evaluation too costly, therefore making it necessary for the owner to accept a lower rate of return on his investment.

Example 3

ONE LOCAL company making industrial finishes recently proposed to expand its plant to provide manufacturing facilities for a product not formerly produced by them in this area. A contract for a large annual output had been signed with a company which used their product in the East and was building a new plant here.

To keep shipping costs low and the price of the product competitive it was necessary to provide local manufacturing facilities. By providing space within their existing factory, management hoped to keep their overhead low, so it was decided to rearrange the existing plant to house the operation.

It was not until the planning had reached this advanced stage that cognizance was taken of local codes. Little could be done to salvage the prior scheme for modernization. A complete re-evaluation of the production facilities was made with the result that a new building had to be erected, a substandard portion of the existing plant demolished and many of the processes moved to new locations within the buildings.

This modernization program due in large part to retroactive regulations, provided separate facilities for lacquer mixing, paint grinding, blending and thinning operations, varnish cooking, cellulose nitrate storage and finished goods storage as well as conveniently-located fire-separated office and laboratory areas.

The time element proved to be a serious problem, due to the delays resulting from the early false start.

* * *

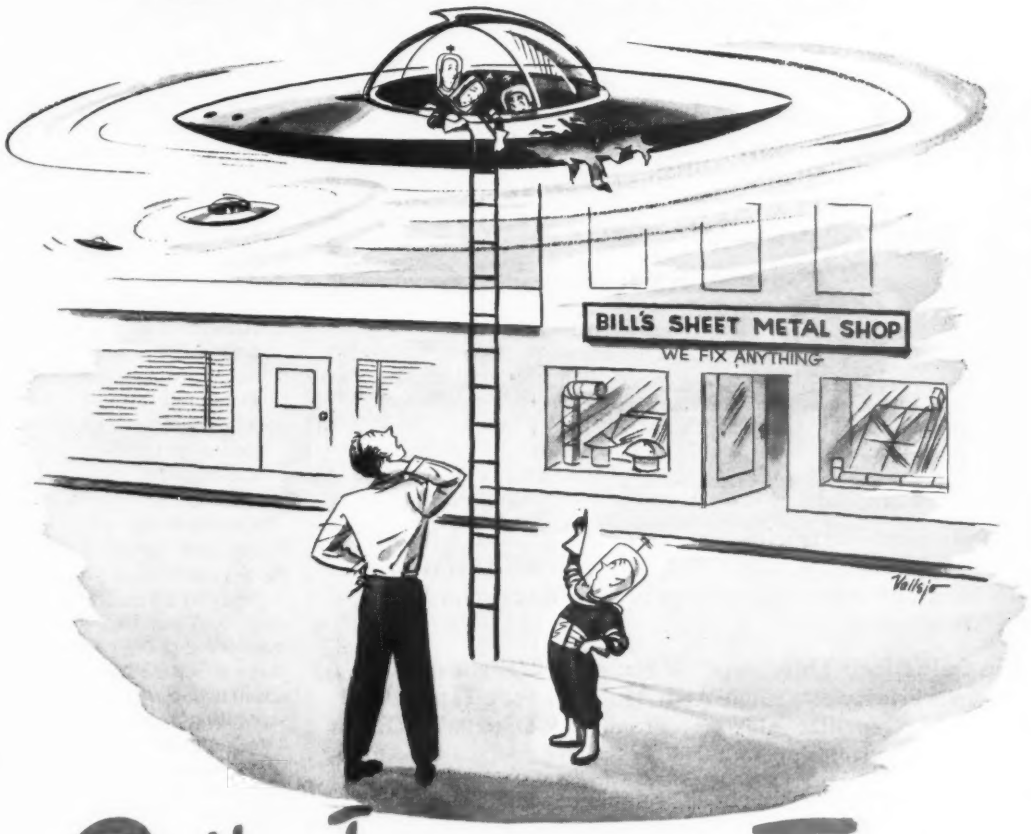
Example 4

A LOCAL manufacturer had a Government contract for metal furniture. The finish was applied by dipping the product in a large tank of paint. When plant management was notified of the Code requirements applicable to the maintenance of such use, it was immediately apparent to them that only two alternates were feasible:

The obvious solution was to provide compliance with applicable Codes without changing the method of opera-

Concluded on page 86

Steel Problems?



Call Jorgensen First

When the problem is over your head and you've come to the end of the rope, let Jorgensen supply you with the right steel for the job. You'll get prompt delivery from complete stocks of carbon, alloy, stainless, tool and specialty steels. For service that's out of this world – *CALL JORGENSEN FIRST!*

EARLE M. JORGENSEN CO.
STEEL

LOS ANGELES	OAKLAND	SAN FRANCISCO	DALLAS	HOUSTON
10650 S. Alameda	1657 W. Grand Ave.	Ask Operator for	2200 W. Commerce St.	5311 Clinton Dr.
LUcas 0281	HIgate 4-2030	Enterprise 10942	RIverside 1761	ORchard 1621

There's Every Reason for Specifying

GOODALL

EXPANSION JOINTS

All requirements for efficient, safe and economical service are met with good measure in GOODALL *Rubber* EXPANSION JOINTS . . . products of long experience and uncompromising craftsmanship.

Wide Selection: Three Types—"Flang-Lok", Right Angle and Sleeve. Five styles—Single Arch, Multiple Arch, Tapered, Offset and Rectangular. All sizes—From 3/8" I. D. to 96" I. D. For pressure, vacuum or both.

Ease of Installation: Light in weight; retaining rings or flanges quickly aligned and bolted; no extra gaskets required between flanges. "Flang-Lok" Joints are especially easy to install.

Long Service Life: Built to specifications assuring highest quality in materials and workmanship, Goodall Expansion Joints operate with long-lasting efficiency at higher working pressures; actually "thrive" under continuous flexing; offer exceptional resistance to abrasive wear; and cannot corrode. Where oil or other rubber-deteriorating agents are present, synthetic linings are used.

Send for Special Expansion Joint Booklet, or Contact Nearest Branch.

Other Goodall Products for industrial service include Steam, Air, Water, Oil and Welding Hose; Bulk and Package Conveyor Belting; Corrosion-Resistant Pipe and Duct; Protective Linings for all types of metal equipment; Waterproof Clothing and Footwear.

PARTICIPATING IN THE MANAGEMENT AND FINANCING OF KENTUCKY SYNTHETIC RUBBER CORPORATION

GOODALL RUBBER COMPANY

Est. 1870

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia · New York · Boston · Pittsburgh · Chicago · Detroit · St. Paul · Los Angeles San Francisco · Seattle · Portland · Salt Lake City · Denver · Houston · Distributors in Other Principal Cities

Goodall Rubber Company of Canada, Ltd., Toronto.

HAZARDOUS MATERIALS QUIZ

. . . Continued from page 84

tion. A list of the required alterations and installations for this solution included:

1. A two-hour fire-resistive separation for the dipping area.
2. Protection of conveyor openings with special high velocity spray equipment.
3. Changing the electrical installation within the enclosure and adjacent to the conveyor openings to equipment approved for a hazardous location.
4. Installation of a mechanical exhaust system of ventilation.
5. Alteration of the sprinkler system and the installation of approved automatic fire extinguishing equipment, and
6. The construction of impounding or drainage facilities to protect the major part of the building from possible fire spread due to flooding of the dip tank.

The first factor in this program—that of providing a physical separation—required a number of costly modifications. A wood truss located directly over the dipping process prevented a vertical separation to the roof. The construction of a horizontal two-hour separation required new footings located approximately four feet below the slab floor to carry the enclosure of the same time period of fire-resistance required for the exhaust system.

Because of the high first cost of the enclosure and related mechanical installations as well as space and time factors, the second alternate—replacing the dipping operation with spray equipment, was chosen. This change in process increased the unit cost to the manufacturer in four ways.

1. More workmen were required to handle the spray equipment.
2. Greater quantities of paints and thinners were required.
3. The volume and control of paint thinning required a new enclosure or outdoor facilities.
4. Maintenance time was increased by cleaning operations necessary for conveyors, spray booths and spray equipment.

In addition, the initial investment in dipping equipment and the expense of alterations to the conveyor system were "white elephants" as far as production costs were concerned.

The company had gained considerable experience with retroactive provisions of the Dangerous Chemicals Code—the expensive way!

DON'T LET IT BECOME OBSOLETE OVERNIGHT

Orderly planning will prevent this from happening

DONALD T. ROBBINS
Chief Design Engineer
Holmes & Narver, Inc.
Engineers-Contractors
Los Angeles

PREVENTING a new plant from becoming an uneconomical, obsolete plant at an early date can be accomplished by good planning, but selection of an engineer or group of engineers for this purpose is one of the most important decisions that management is called upon to make.

An established company going into a new field, or a new company just organized for the purpose of starting and developing a certain manufacturing process, should probably try to find a firm of engineers who have specialized in their particular field, and thus benefit by the engineer's experience and hope to avoid pitfalls which the inexperienced plant management might easily fall into.

If, on the other hand, the proposed project is a new plant to expand the capacity of an experienced manufacturer, his organization will include men thoroughly familiar with the processes involved and qualified to set up criteria wherein quantities and qualities can be definitely stated.

Opposed to this reasoning, companies making or processing certain things for a long time may be so imbued with tradition that they do not want to change a process, even though it is conceded that there may be a better way or a cheaper way to accomplish the desired result.

Outside help

Many times the ideas of people from outside, so to speak, are very helpful. The right kind of engineers, having imagination and inquisitive minds, may ask some silly questions and make impractical suggestions, but they will also come forward with some very desirable ideas, which might be overlooked by men too close to the everyday way of doing something.

By "general industrial plant design" is meant the design of industrial plants in which processes carried out may be dissimilar. Each individual process is distinct and different from all others, but all processes have much in common fundamentally.

Successful analysis

For example, take steam. The industrial production man can say, "I need to heat a certain substance from a certain temperature to another determined temperature, and use of steam in a coil is a satisfactory method." The engineer, versed in the properties of steam, can design a heater to accomplish required results, even though he has never before been faced with the exact problem involved. The ultimate objective is to produce an industrial plant in which a process can be carried out economically, efficiently and uniformly.

The next step in development of mechanical and electrical installations for the plant is to have the industrial management set forth the general requirements of what is proposed to be accomplished in the projected plant, not only immediately but what future expansion may be contemplated. This requires broad, factual diagnosis of the present and future market the plant may find for the product.

Now it is time for the production men to sit down with the engineers and explain broadly the process. All special limitations or unusual critical conditions that must be met should be carefully analyzed. This conference may be one meeting, or it may require many sessions, depending on the simplicity or complexity of the process.

If management has established a budget, the engineer must be informed as to how much money is available. He will then make some preliminary estimates to determine if, in his experienced opinion, the desired facilities can be constructed with the available funds. If no budget has been established by management, the engineer should make a budget estimate and submit it to management for their consideration and action.

If funds appear to be inadequate, there are several alternatives. One is to reduce the capacity of the plant to a point where available funds will buy the necessary facilities. Another is to eliminate some costly refinements which are desirable but not essential. Still another is to make use of cheaper substitutes for some or many facilities.

None of these are desirable, but it is a cold, hard fact that if a plant cannot be built to do what is required for the money available, the whole project had better be abandoned now before any more money is spent in developing plans that cannot be executed.

Costs too high

If bids are taken and the cost turns out to be too high, then drastic changes may be required which more than offset all the good of planning. If, on the other hand, construction is begun and with the plant partly completed and commitments made for material and equipment, the sad truth is learned that there is not enough money to complete the project, someone has the very unpleasant duty of, in some manner, raising more money.

Now management is faced with a large capital investment out of proportion to the return to be realized by operation of the plant. So the first, and one of the most important, steps

is to make a realistic estimate of cost and budget, and fit the planning to within the realm of possibility.

Proper and workable planning must be based on the proper flow of materials, whether solid, liquid or gaseous, through the plant. Time spent on very complete and detailed flow diagrams is time well spent, and will pay dividends later on when the working drawings are being prepared. Flow diagrams provide concise statements of basic design criteria in more or less picture form. These, prepared by the engineer, show his concept of requirements which have been established by the client.

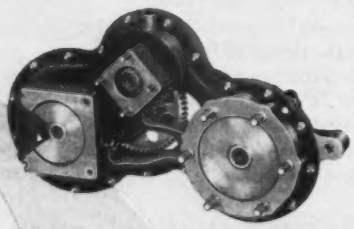
We are now ready to consider the physical arrangement of the component parts of the process and preliminary sketches showing space requirements may be developed. Serious thought must be given to future expansion. Can the various units of the plant each be expanded as required without interfering with other elements? When the plant has reached its ultimate expansion, will the flow of material and work still be smooth and without lost motion?

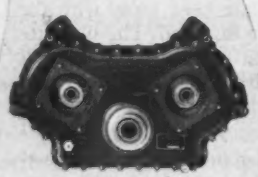
Arrangement of buildings, facilities for receiving raw materials and shipping the finished product and availability of public utilities in adequate quantities and under proper conditions of pressure, etc., must all be considered. Consultation with the mechanical and electrical engineers can be of great benefit. It is difficult to treat one or two phases of industrial plant design independently.

After flow diagrams have been accepted and preliminary sketches showing physical arrangement of all facilities have been approved, it is then time to go into detailed planning.

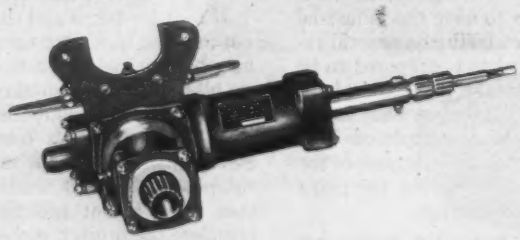
ADVANCE Gear Assemblies

DESIGNED TO MEET YOUR SPECIFIC NEEDS





In addition to designing and cutting all types of gears, ADVANCE Gear & Machine Corp. is particularly qualified to produce gear assemblies. Whether it be an integral part of some massive production equipment . . . an important gear assembly for commercial or government aircraft or a production run involving an intricate gear assembly . . . whatever your gear assembly problem may be, ADVANCE Gear & Machine Corp. is qualified to serve you. Our engineers will work hand-in-hand with your engineers to produce exactly the type of gear assembly to meet your requirements. In many instances, ADVANCE Gear's engineering know-how and production methods have resulted in huge savings for our customers. We invite your consideration of our facilities.



Advance Gear & Machine Corp.

5851 Holmes Ave., Los Angeles 1, Calif.

COLUMBIA BASIN development study

UNANIMOUS agreement now exists in the Columbia Basin Inter-Agency Committee on a large portion of the region-wide plan for the orderly and balanced development of the Columbia Basin. This committee, organized in Portland, to coordinate the activities of the federal agencies, consists of one representative from each department of the seven basin states.

Members agree on following points:

Work now under way on the following major projects should be brought to completion at the earliest practicable date: Hungry Horse, McNary, Chief Joseph, Albeni Falls, Detroit-Big Cliff, Lookout Point-Dexter, and The Dalles power, navigation, and flood control projects.

Transmission lines and accessories should be built as necessary for utilization of power. A network of hydrometeorological stations should accompany river system expansion.

In the emergency period, resource conservation and development work needed for defense should be conducted for the preservation of our soil, forests, ranges, and water. The kinds of work deserving high priority at this time include: fishery research; comprehensive land program; access roads to permit development of resources; mineral exploration and research, recreation plan; general investigations for development; municipal and industrial water supply and pollution abatement projects.

The committee is striving for a region-wide plan which will include: effective conservation program for the region's resources; optimum distribution of benefits; advisory consultation with representatives of the public; a continuous appraisal of regional resources with a view to maximizing the regional contribution to the national economy; developmental progress consistent with the desires of the people of the Northwest.

FASTENERS

This shows a large bolt being threaded on special equipment at Triangle Steel & Supply Co.

MACHINE BOLTS
CARRIAGE AND LAG

ANCHOR BOLTS

SCREWS · NUTS

TOOLS

SPECIAL THREADING

AT TRIANGLE STEEL & SUPPLY CO...

"we do the impossible–immediately!"

Now... complete stocks

DARDELET "RIVET-BOLTS"

For speed, economy and security, in structural steel assembly, nothing can match the Dardelet "Rivet-Bolt", quickly driven home and then locked in position with a wrench. They carry full approval of authorities and meet all building codes. In stock, ready for delivery.

BECAUSE WE CARRY IN STOCK, tremendous quantities, and complete assortments of all kinds of threaded products, special requests for unusual items are easily filled. If you need bolts, extra-long or of large diameter, the chances are we have it in stock, ready for delivery. Mention Clevises, Turnbuckles or Eye Bolts and we have them on hand.

In addition to the huge stock at Triangle Steel, we maintain a large department, where trained operators with special equipment stand ready to say "can do" if you need a special, difficult, unusual threaded product. Simply telephone and we'll be on the job, immediately!

ANGELUS 3-7373

TRIANGLE STEEL & SUPPLY CO.

3691 Bandini Blvd. Vernon Station, Los Angeles, California

ROBERT A. TRUMPIS
Trumpis-Collar and Associates
Industrial Engineers
Los Angeles

SELECTING YOUR EQUIPMENT

SELECTION of equipment is a part of an integrated procedure generally called "manufacturing planning." In its purest form, manufacturing planning is the action of breaking down a product design or idea into a method of fabrication and assembly.

The difference between mass production and job lot techniques is the ability to warrant expenditures for high production tooling and equipment with well planned auxiliary secondary handling equipment and mechanized material handling between operations, as against a limited quantity production which must be kept to simple applications of tooling and equipment use.

Depending on the materials selected, the question of whether or not the product to be produced is to be mass produced or job lot produced governs the extent over which the planner can make his decisions of tools, dies, and machinery.

Obviously automatic equipment, with little or no handling between operations is the best choice that the planner can make. However, such equipment is generally of a special type, possibly specially designed, and the capital investment is high. Consequently the planner generally guides his production breakdown to operations that can be produced in simple basic equipment such as the shear, brake, the punch press, hydraulic presses, rolls, spot welders, hand arc welding, etc.

Competitive key

Unfortunately the manufacturing planner often holds the key to the entire success or failure of the merchandising organization. This is the key to why Western production costs are not nearly as competitive on many products.

The manufacturing planner must be given the goal to meet cost-wise, and should be permitted to select his manufacturing procedure based on the merchandising program rather than the reverse as at present exists in most manufacturing organizations.

Let me explain what effect this would have on the selection of equipment. Special purpose equipment for multiple operation work; thread rollers; four slide machines; special wire working machines; progressive automatic drilling, boring, honing equipment; hopper fed broachers; automatic arc welders; multiple roll sheet metal forming equipment; and other high speed types of equipment would be the rule instead of limited quantities of special purpose equipment.

Volume therefore is the limiting factor in the selection of equipment. But this is a false front which is not being

. . . at long last!!

CLEAN CONDENSERS

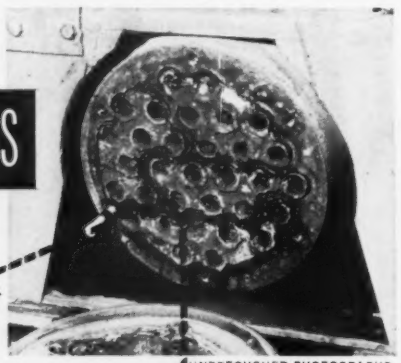
Without { ACIDIZING OR RODDING!

AUGUST 5, 1952

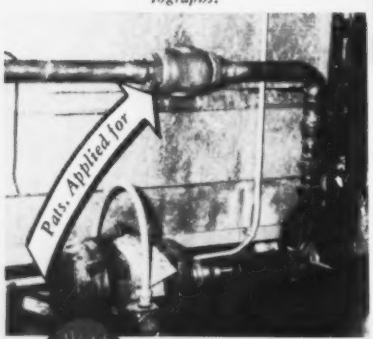
MARCH 20, 1953

High Efficiency
Low Maintenance

Buchanan Refrigeration Service (of Redwood City) made the Broadway Market installation. Foreman's (of Belmont, Calif.) made the photographs.



UNRETOUCHED PHOTOGRAPHS



The Broadway Market, in Redwood City (Calif.), is but one of many hundreds of amazing EVIS installations. All over the United States EVIS Water Conditioners are conquering scale in practically all types of refrigeration equipment. The top photograph was made at the time the Evis was installed . . . a quarter-inch rod was *driven* through the tubes . . . two weeks later much of the scale was sufficiently soft to be prodded out with a small diameter tube . . . the condenser was not opened again for six months . . . the bottom photograph clearly shows what the EVIS had accomplished.

• • •

If Evis Conditioners are not yet available in your locality . . . phone or write your nearest Evis Regional Distributor for complete information.

© 1953, EVIS MFG. CO. EV-83

EVIS WATER & FLUID CONDITIONERS

FRANCHISED REGIONAL DISTRIBUTORS

WHITTIER (Calif.) KEN-EVIS COMPANY 11788 E. Whittier, OX 9-2211
SAN BERNARDINO (Calif.) KNUPPE & WRIGHT 220 E. 40th St., SB 8-7838
SAN FRANCISCO NORTH-EVIS AGENCY 74 Dorman Ave., MI 7-3822
RENO WATER CONDITIONED SALES CORP. Western Amer. Life Bldg., 2-3618
SEATTLE EVIS-NORTHWEST 2417 E. Marginal Way, EL-6116
CHICAGO EVIS-GREAT LAKES COMPANY 203 N. Wabash Ave., ST 2-5948
OMAHA EVIS-MIDWEST, INC. 1304 Dodge St., JA 7-044
DALLAS EVIS-SOUTHWEST CO. 8807 Chevy Chase, EM 0137
ATLANTA EVIS-SOUTHEAST CO. 735 Spring St., N.W., VE-0241
PHILADELPHIA EVIS-MIDEAST CO. 4 E. Richmond St., NE 4-0855
ALBANY (New York) EVIS-NORTHEAST CO. 37 Ripple Dr., UN 9-7921
EXCLUSIVE MARINE DIST. MORAN-EVIS CO., SAN FRANCISCO 420 Market St., DO 2-4565

EVIS IS NOT A SOFTENER

corrected on the West Coast. Here the tab for equipment is borne by the tax payer and the question of economical amortization is not involved.

Volume can be built by meeting the price needs of the merchandisers. The management of an organization must therefore start the ball rolling with good merchandising programs not limited to Western States sales but based on invasion of Eastern markets with their vastly larger populations.

Essentially there is no program that Western industry faces that is more important than this problem of trying to raise the volume of demand or the potential market volume. As long as manufacturers on the West Coast plan their production potential based on Western markets, specialized high production type tools, dies, machinery and production aids cannot be a part of the planner's operation. As an industrial area, the great West Coast is fast becoming a center of production problems and changes of methods which will in the very near future obsolete a great deal of the capital investment now utilized for production.

Automation the answer

More and more the Western plants must approach the millenium, namely, complete automation. Less labor and more automatic equipment and auxiliary aids to handle materials between operations mechanically.

This age of production will be upon the West Coast in a matter of ten years or less, and is already being felt in some industries which have solved the problem of merchandising nationally and internationally, thereby creating the all-important volume requirement which enables planners to produce at low unit costs, on special type equipment, and dies and tools of a much higher capital investment.

When this millenium occurs there will be a great upsurge of machine tool and special equipment producers located on this West Coast, and I predict that the ingenuity and production planning abilities of the Western engineer will then be in as great demand as is the demand for the Eastern industrial engineer now.

Perhaps then the architects and the construction organizations will apply themselves more diligently to production methods, re-usable forms, low cost slabs, prefabricated unit structures that can be assembled into a variety of plant configurations at a low cost per square foot, and with the natural climatic conditions we enjoy on the West Coast, make building construction costs a major factor in luring more industries from the East to our shores.

Stacking shingles to the rafters at Bird & Son, Inc., Chicago

How to boost your stock ...with the boss

You can cut materials handling time up to 50% and more all along the line—from receiving, clear through to shipping—with TOWMOTOR! Many users have more than doubled storage space. And only TOWMOTOR gives you TowmoTorque, the amazing new drive that eliminates clutching and gear-shifting. Plus effortless TOWMOTOR Power Steering! Plus revolutionary new Diesels with Cushioned Power! Plus time-tested Preventive Maintenance! Send for booklet describing TowmoTorque and Power Steering. TOWMOTOR CORPORATION, Div. 6705, 1226 E. 152nd St., Cleveland, Ohio.

TOWMOTOR
THE ONE-MAN-GANG ®

FORK LIFT TRUCKS AND TRACTORS

Since 1919

TOWMOTOR ENGINEERED FOR QUALITY PERFORMANCE

It's a lot easier to work with

RIDGID

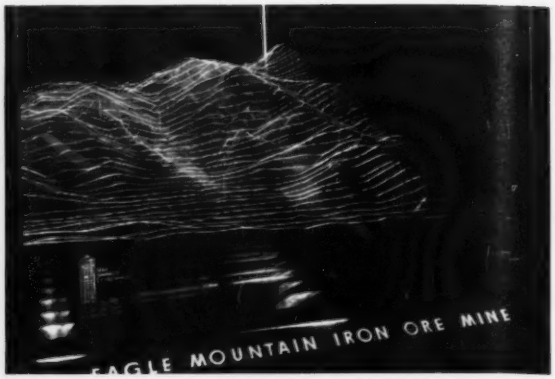
Extra-Utility Pipe Vises

Compare those work-saver RIDGID Vises with any others and you see the bonus of extra utility you get for your money. Kit vise is easily toted to the job, quickly clamped on edge of bench or plank, ready for use. All other RIDGID vises have handy integral pipe benders and rests to make cutting and threading easier. Full-width firm-gripping jaws of top quality tool-steel, bodies of rugged special malleable—for years of service. 9 models, yoke and chain, 23 sizes, meet every need. Get your money's worth—buy RIDGID Vises at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID
Work-Saver Pipe Tools

"X-RAY" OF AN iron mountain



EASY to visualize the ore. Lines traced on 46 glass plates set two inches apart indicate the location of the underground ore bodies (line colors shows grades) and projected excavations

A FACTUAL new type of display that shows underground iron bodies on parallel, transparent glass plates by means of fluorescent, black-light-illuminated colors, is being exhibited at Kaiser Steel Corporation's Fontana, California, mill.

Represented is the North-South area of Eagle Mountain mines, 164 rail miles southeast of Fontana. Details of the mine are shown with iron content of the ore strata, open-pit operation levels, elevation, drilling lines, etc. The model is 6 x 10 feet, scale 60 feet to the inch. The actual mine is about a mile long, and one-third of a mile wide and contains iron ore sufficient to feed Fontana's three blast furnaces for 25 years of continuous operation. This is only a small portion of the seven mile strip of rugged ore-bearing properties owned by Kaiser.

Supplementing the model are photographs of the properties and a series of five charts depicting the geologic history of the region from two billion years ago to now.

NEW METAL FASTENING makes debut

WILLIAMS METALACING, a new method which buttons metal to metal, is now being released by Crockatt Engineering Co. of San Francisco for its inventor Ivan A. Williams. This one-step process of fastening sheet metal may be accomplished on any ordinary punch press, converted by inserting a special punch and die. "Speed, economy, and simplicity of this process make it an important method of fabricating and fastening sheet metal" according to manufacturing executives.

First, the punch creates a parallel double incision in the two sheets of metal being fastened. Metal between these incisions is pushed downward, against the anvil of the die beneath the sheets and between the die's yieldable jaws. There the force of the impact spreads the depressed metal sideways, making it form a permanent fastening wedge or button under the surface of the bottom sheet.

Strength and holding qualities of the "Metalace" fastening compare with conventional rivets at a ratio of three laces to two rivets. It is designed to work with any metal which can be sheared, drawn and upset. It can be used with metal sheeting up to ¼ in. thick. Major users are expected to be pipe and duct makers; truck, train, and airplane manufacturers; stamping works; and heating and ventilating factories.

VULCAN FOUNDRY COMPANY

Announces

DUCTILE IRON

a versatile new metal

After three years of experimentation and development, we are now consistently producing Ductile Iron in several exact specification ranges. This broad experience and our full facilities guarantee the casting buyer a product that combines many of the best features of cast iron, malleable iron and low carbon cast steel. The properties of Ductile Iron make this material a completely adequate replacement for many brass and bronze applications at a considerably reduced cost.

DUCTILE IRON COMBINES

The Best Properties of Cast Iron *plus* Many Properties of Cast Steel

- Low cost
- Casts readily into intricate shapes
- Section thicknesses from 1/10th inch to 50 inches
- High corrosion resistance
- Excellent machineability
- Exceptional wear resistance (lubricated or non-lubricated)

- Tensile Strengths – up to 100,000 psi. as cast
- Ductility – From 2 to 25% elongation in 2" according to type and condition
- High Rigidity – Elastic modulus 23-25,000,000 psi., virtually unaffected by section thickness
- Weldability – Welds to steel and to itself.

Our experience in the commercial production of Ductile cast iron has proved to us that the applications for this material are unlimited. All inquiries will receive our prompt attention and we will gladly furnish completely documented evidence as to the physical characteristics of Ductile Iron.

VULCAN FOUNDRY COMPANY

4401 San Leandro Street • Oakland 1, California • KEllog 2-6260

GET THE MOST OUT OF YOUR CYLINDERS with Ledeen VALVES

HAND OPERATED 4-WAY VALVE

Three models: Completely Manual—Spring Return to Neutral—Spring Return to Reverse. Flow cycles to handle most requirements.

FOOT OPERATED 4-WAY VALVE

Same as Hand Operated Valve, except foot operation replaces hand. Leaves hands free for other work.

POWER OPERATED 4-WAY VALVE

For remote control, safety or automatic equipment. Suitable for solenoid, cam, finger, toe or hand operation.

Ledeen valves are built in sizes from ⅛" to 1¼" standard pipe tap—to operate air and hydraulic cylinders and motors, single and double acting.

Write for Bulletin 1000

VALVES • CYLINDERS
AIR-HYDRAULIC PUMPS & BOOSTERS
VALVE ACTUATORS • AIR HOISTS

Ledeen Mfg. Co.
1600 So. San Pedro
Los Angeles 15, Calif.

PACKAGE "DEALS" versus INDIVIDUAL CONSTRUCTION

MERLE F. SMITH
Vice President
T. S. Construction Engineers, Inc.
Los Angeles

"PACKAGE DEALS" in the construction industry refer to design and construction of a building under one contract, all the work being done under one management. The few firms that carry on this type of operation usually specialize in one particular type of construction which they promote as their featured selling point.

They frequently offer their product as a cure-all for all types of construction and claim they can do the job cheaper by their methods than any other way. Some specialists try to sell their methods to specialized buildings regardless of cost or proper analysis of the use.

This method of trying to fit structure to operation of the building is like putting the cart before the horse. The building should be designed to meet the needs of the operation. No one type of construction can be a cure-all or answer to every problem. The only reason for adopting a particular type of construction is that it meets the necessary cost budget and functional requirements.

The package deal operator advertises complete buildings for a fixed cost per sq. ft. The building may be complete insofar as the manufacturer claims, but it cannot possibly complete the needs of the required operation of the owner.

Standard foundations will only meet the client's need by a miracle. So in order to meet soil and topography conditions there will be added or extra costs to meet site conditions.

Electrical outlets are also liable to be in inconvenient places which will necessitate the paying of an added

We can take care of all your forging needs—big or little...
CALL US NOW!

It pays to buy...
*AMERICAN FORGINGS

*AMERICAN FORGE CO.
Executive offices and plant: Niles, California
Phone Niles 3311
Sales offices:
101 Park Ave., New York City
Portland, Oregon
Los Angeles, California
Salt Lake City, Utah

7

Because You Get...

HIGH QUALITY
press forgings, open hammer forgings, drop forgings, upset forgings, grinding media—all made by West's largest and most complete forging plant ... all produced to most exacting tolerances.

ONLY CERTIFIED STEELS
are used in the manufacture of our forgings. All forgings are heat treated under supervision of metallurgists. Complete physical and chemical reports supplied with all major components.

FREE CONSULTING SERVICE AND METALLURGICAL LABORATORY
to study, test and make sure you get the right type of forging, steel and grain structure for your job.

cost. Fire protection, sprinklers, plumbing and heating are also liable to be extras. Partitions to be moved, and other required moves are the same.

Changes will undoubtedly have to be made as construction progresses if the desired results are to be obtained. These will cost more than if they were originally incorporated in the building. The owner does not usually have the experience or knowledge to check these extra costs, and they go up and up.

Other types of building, such as steel structures, are sold on a unit basis and usually for storage space. Prices quoted for these usually excludes such items as foundation, floors, lighting, etc., so in order to obtain a complete cost the excluded items have to be added.

This form of advertising is misleading and gives the layman the wrong impression as to costs. The layman does not read the fine print nor does he know the cost of missing items necessary to complete the building.

Package deal contractors cannot compete on the open market along with non-specializing contractors, as can be shown by an illustration. Two package dealers submitted bids on a tilt-wall project, along with other contractors. When the bids were opened, neither were in the running and the tilt-wall specialist was the high bidder. They usually do not have the open market to call upon for their sub-contracting as do those contractors who do not design as well as build.

Selling services

The best method for a person contemplating having a building constructed, is to select an architect or engineer who sells service, not items. I sincerely believe that a good architect or engineer will save the prospective owner the cost of his services, in economy of design, workable layout, and the meeting of a budget cost. In addition, he will check all changes or extras submitted to the builder, and inspect the project to see that the contractor builds according to plans and specifications, and that there is no faulty material or workmanship. In short, he sees that the owner gets what he pays for in addition to proper planning and economy of design. The builder is answerable to the architect or engineer as the latter is the representative of the owner.

When selecting the engineer, architect, or contractor, the owner should consider local talent. This saves money because a local man will know building codes, labor and material markets, and the local sub-contractor situation, as well as best fitted types of construction for the particular locality.

SAVE MONEY— *as fast as you can . . .*

Pull...Zip...Stick!

Labeling or marking costs can be *reduced* — by fully 50% — thru PEE-CHEE the new printed self-adhesive (Scotch Brand) tape if you are:

Furnace installation instructions—Utility Appliance.

- **Changing prices**
- **Sealing packages**
- **Warning, instructing or coding**
- **Adding merchandising messages**
- **Indicating weights or contents**
- **Correcting package printing errors**
- **Showing specifications or diagrams**
- **ANYWHERE YOU'D USE A DECAL OR GUMMED LABEL!**

High speed trademark labeling—Deeco Inc.

PEE-CEE tapes stick upon contact . . . never "pop" or peel. Bring us your technical problems!

Write or phone for trained advisor to call and demonstrate PEE-CEE tapes, as used in your industry, or send for free printed tape samples today.

Representatives throughout the West.

San Francisco . . .
119 New Montgomery St.,
SUtter 1-5490

Printed CELLOPHANE TAPE *Company*

521 No. La Brea Ave.
Los Angeles 36
California
WEbster 1-1014

HELPFUL LITERATURE

for the plant operator who wants to keep informed

Use rip-out post-card for your free copies

1

Look into positive lubrication

Farval's bulletin No. 25 on centralized systems of lubrication tells you by word and picture about a positive mechanical method of delivering oil or grease under pressure to a group of bearings from one central station, in exact measured quantities and as often as desired. A double page collection of fitting and accessory drawings and pictures is included to simplify your planning and ordering. *The Farval Corp.*

2

Forms of formica

A full discussion of this laminated thermosetting plastic is presented in a new 16-page bulletin published by *The Formica Co.* You will learn about its manufacture, care and profitable use. Bulletin's clear charts include a particularly thorough one covering major characteristics of material.

3

A Reliance item

Rings, springtites, spring lock washers, hoz-fas-ners, and thread-cutting springtites and sems are all covered in this brochure by excellent illustrative matter—both pictorial and printed. Many detailed charts will aid you in selection of proper pieces for your purposes. *Eaton Manufacturing Co., Reliance Div.*

4

Insulation specifications for oil and chemical industries

Fresh from *Johns-Manville* is a 52-page brochure entitled, "Johns-Manville Insulation Specifications for Oil Refineries and Chemical Process Plants." It is designed as a quick reference for engineers and others who must specify thermal insulations in these industries. Specifications are written for economy of operation, better control of process temperatures and for safety of both personnel and equipment.

5

Rubber putty put into print

A rubber putty, called "Plastikon," that is watertight, airtight, and does not become brittle is described in a catalog just published by *The B. F. Goodrich Co.* Among other things, this publication shows how product remains pliable even when used in refrigerated cold cabinets.

6

On a new aluminum trailer

Trailmobile, Inc., has put out a new model Trailmobile constructed of lightweight aluminum. A folder describing and illustrating this new model is now available to all interested. It explains the features of lightweight construction, low maintenance costs, greater inside width and more reasonable price.

7

Booklet on "Link-Belt"

A new 16-page booklet describing all 22 sizes of Steel Link-Belt is available from *Link-Belt Co.* of Chicago. Included are 14 basic attachments as well as the Link-Belt Easy Chain Detacher. Detailed specifications are given for all chains and attachments. (2403)

8

"See better—work better" bulletin

A new eight-page illustrated publication in full color is added to *General Electric's Lamp Division* series on improved lighting in nation's industrial plants. Bulletin No. 8 describes "revolution in industrial lighting" based on concept of balanced brightness as well as sufficient light over entire work area.

9

For more efficient powered industrial trucks

The *Elwell-Parker Electric Co.'s* two-color booklet tells you how to increase efficiency of your powered industrial trucks by use of specially designed attachments. More than 25 of these devices are illustrated. Each picture is accompanied by detailed text on design and application.

10

An answer to plant sanitation

A folder from *Industrial Sanitation Service* explains firm's plan to aid food manufacturers and processors maintain a high level of purity and quality. Company offers a preliminary survey of your plant, at no obligation, in order to analyze plant conditions and determine type and extent of program that would be helpful.

11

Rip along with Rippolite

Alexander H. Kerr & Co., Inc.'s folder on Rippolite tells story of this translucent structural paneling. Material is a lightweight, corrugated, flat and molded, glass fiber reinforced plastic. In brief form, technical data is given on its characteristics such as light and heat transmission, strength, hardness, flammability, etc. Installation is also discussed.

12

Technical data on air and hydraulic cylinders

Here is good stuff for engineers. Brochure contains 8 pages of detailed drawings and diagrams showing specifications, rating tables and performance statistics on various models. Encircle above key number on Reader Service card for more information. *Modernair Corp.*

13

Elevated literature at hand

Complete line of Barrett industrial elevators is presented in a 36-page

TOP QUALITY
Write for Literature and Prices

R&K INDUSTRIAL WHEELS

FULLY GUARANTEED
Dealer Territories Available

R & K Industrial Products Co. • 1945 No. 7th Street, Richmond 5, Calif. • BEacon 4-3382

Make Your Own Hose Lines

AEROQUIP HOSE AND FITTINGS ARE MATCHED FOR GUARANTEED PERFORMANCE

● No skill or special training is required to assemble Aeroquip Flexible Hose Lines by hand *in a matter of minutes!* YOU CUT COSTS because Aeroquip fittings are detachable and may be used again and again. YOU REDUCE INVENTORY because with Aeroquip bulk hose and a few fittings you can fill practically all your hose line requirements. YOU REDUCE DOWNTIME because with Aeroquip on hand, quick hose line replacements are available at all times.

Cut hose to length with hacksaw; screw into socket.

Oil nipple and inside of hose liberally.

Screw nipple into socket and hose.

Install fitting on other end; hose line is ready for use.

Aeroquip

REG. TRADE MARK

AERO-COUPLING CORPORATION

(A Subsidiary Of Aeroquip Corporation)

3015 Winona Avenue, Burbank, Calif.

SALES OFFICE and WAREHOUSE for OREGON, WASHINGTON and IDAHO: SPARKS-WILLS, INC., 1624 S. E. GRAND AVE., PORTLAND 14, ORE.

two-color bulletin just released by *Barrett-Cravens Co.* Profusely illustrated, diagrammed and filled with informational material, bulletin covers elevators from portable types to floor-to-floor elevators. Portable cranes and hand and electric hoists are also shown. 5211

14

"There's an Angle to Increasing Existing Storage Space" . . .

. . . is title of a six-page materials handling study released by *The Baker-Raulang Co.* Illustrated report shows how oblique stacking cuts down aisle requirements, actually provides more storage capacity and how easier stock selection and faster inventory checks are made possible.

15

Flame-plating service for industry

Features of a new service—application of undiluted coatings of powdered metals to metal parts—is described in a 12-page illustrated booklet entitled "Flame-Plating," published by *Linde Air Products Co.* Properties of these coatings, results of wear tests, tested applications and method's limitations are all presented. F-8065

16

"On Target" with airtubes

Lamson Corp. issues a well-planned, colorful 50-page booklet entitled, "On Target" showing many uses for firm's airtube systems in modern industry. A number of case histories are presented. Technical data section gives full details on component parts of system, and power units are described to round out presentation.

17

Accurate bench milling machine described

A two-color folder from *Rotex Punch Co.* presents its Model RM-1 bench milling machine made for use in manufacturing plants, experimental labs, tool rooms, schools and home hobby shops. Lists of outstanding features, specifications, and attachments are included.

18

"Texrope" V-belts for tough jobs

A bulletin, put out by *Allis-Chalmers Manufacturing Co.*, tells you where, when and why to use its super-7 high capacity belts (Texrope). 20B-7786

19

"Union Labor in California, 1952"

This publication, put out by State of California department of Industrial Relations, is a report on union membership in California—paid vacation, holiday, and sick leave provisions in California Union Agreements during year.

20

Lit. on copper and brass

A full-size bulletin listing nearly seventy catalogs and technical handbooks on copper and brass products is published by *Chase Brass & Copper Co., Inc.* Bulletin also lists available newspaper mats, data charts and radio scripts for promotion of brass and copper products. Back cover provides prepaid reply cards for ordering.

21

Economical blast cleaning in non-ferrous foundries

How airless blast cleaning can be used in a non-ferrous foundry to effect reductions in finishing costs of all kinds of castings is shown in a new bulletin published by *American Wheelabrator & Equipment Corp.* Case histories cover brass, bronze, aluminum and allied fields. Performance data shows how airless blasting can be justified in both large and small foundries. 904

22

A tape dispenser for every purpose

A complete line of taping machines and dispensers for use with over 200 "Scotch" brand pressure-sensitive tapes is shown in a new 8-page booklet from *Minnesota Mining and Manufacturing Co.* Forty-nine dispensers and taping machines are pictured with information on which size tapes can be accommodated. Logical uses for each dispenser or taping machine are also given.

23

How to splice wire rope on the job

Here, in 30 well illustrated pages, is a picture story of splicing two ends of Bethlehem 6 x 19 class can conveyor wire ropes. A splicing specialist from *Bethlehem Steel Co.* set up his vise and wire ropes in front of a camera. Photographs taken as he did actual splicing, step by step, are accompanied by explanatory comments. 328

24

"Light—good working light—is valuable property" . . .

. . . states a new catalog-type folder describing Arco Mill White Paints, produced by *The Arco Co.*, 71-year old specialists in paints for industry. Emphasis is placed on utmost utilization of working light through use of dense, fast-covering white paint for interiors of mills, factories, etc.

25

Aircraft products condensed in a brochure

Vard, Inc., manufacturer of ball screw assemblies, worm gears and fractional horsepower motors, offers its new "Vard Brochure" to acquaint aircraft and allied industries with firm's products and facilities. Two-color 12-page booklet winds up with a handy chart guide showing typical operating loads of standard ball screw units.

26

Industrial metals charted for convenience

An unusual chart, showing composition of all commonly used metals and alloys in industry comes from *Sam Tour & Co., Inc.*, research and testing consulting firm. Chart lists constituent elements and percentage composition ranges for 60 different classes. Also shown are atomic number and specific gravity of 48 elements commonly encountered in industrial metals.

27

Guide to flexible gear couplings

A two-color 16-page brochure from *Sier-Bath Gear & Pump Co., Inc.*, details advantages of firm's flexible gear couplings, typical applications, standard types, special types and winds up with two pages of engineering data. Specifications for each type are neatly given in chart form.

28

On choosing the Wright saw

A folded folder, by *Wright Power Saw and Tool Corp.*, illustrates outstanding features of company's product and, in a concise chart, gives you specifications and data on motor, saw blades, weight, etc.

29

For those interested in hole punching

A colorful 16-page brochure, evenly punched up and down its left-hand margin, provides complete information on Wales Type "CJ" hole punching units that punch holes in mild steel up to ¼ in. thick. *Wales-Strippit Corp.* Catalog CJ

30

Comparison charts for materials handling trucks

Two new comparison charts covering riding and walkie type electric industrial trucks, both high and low lift, are now available from *Lewis-Shepard.* These charts, with buying guides listed, are designed to permit an objective point by point comparative analysis of various makes. Printed on heavy stock, they are conveniently sized for filing.

31

Dope on herringbone gear drives fills 36 pages

Detailed information about single, double and triple reduction enclosed herringbone gear drives is enclosed in this new 36-page booklet just published by *Link-Belt Co.* Installation photographs show examples of these drives in many types of heavy duty service. Horsepower rating tables contain many new ratios. Standardized packaged drives are listed with dimensions and NEMA motor frame numbers. (2519)

32

M-H people—look at this

Ira G. Perin Co. is now offering *Elwell-Parker's* newest folder on heavy-duty ram and fork trucks. Action photos are included showing these machines in action transporting coils and sheet steel. Various applications within a plant are included. Eleven models are described with load capacity, overall dimensions and engineering features.

33

Information on acetylene cylinders

A detailed analysis of welded and seamless acetylene cylinders is issued in folder form by *Coyne Sales Co.* Bulletin includes concise, easy-to-read descriptions of cylinder caps, valves, safety devices, fillers and markings, plus photographs and technical drawings. Sizes of both Coyne seamless and welded cylinders, acetylene and water capacities, shipping weights, and similar information is also given.

34

"Tips on Stainless for Aircraft Hydraulics" . . .

. . . is a five-page illustrated reprint discussing problems of design, fabrication, material selection and correct handling of stainless steel hydraulic tubing in aircraft. Tables list mechanical properties of stainless steel tubing for aircraft hydraulic and fluid lines, minimum bend radii and standard hydraulic tubing sizes for seamless, welded, and drawn tubing. *Superior Tube Co.*

35

Guide to cleanup

Oakite Products, Inc., manufacturer of industrial cleaning and related materials, now publishes a 30-page illustrated guide reviewing latest procedures designed to simplify maintenance cleaning in pulp and paper mills. Operations include descaling pulp mill liquor heaters, cleaning rubber-covered suction press rolls, etc.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 3755, Sec. 34.9, P. L. & R., San Francisco, Calif.

WESTERN INDUSTRY
609 Mission Street
San Francisco 5, Calif.

USE A POSTCARD for THESE THREE FREE SERVICES

1. For your free copies of **HELPFUL LITERATURE** reviewed in this issue, circle appropriate key numbers.
2. For more information on **NEW MATERIALS AND EQUIPMENT** previewed on following pages, circle key numbers.
3. For complete information on **PRODUCTS ADVERTISED** in this issue, fill in page number and name of advertiser.

Send free booklets and more information on new products listed under circled key numbers:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Send complete information about products advertised on:

Page..... **by**.....

Page..... **by**.....

Page..... **by**.....

Name.....

Address.....

.....

Position.....

Organization..... **MAY 1953**

Send free booklets and more information on new products listed under circled key numbers:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Send complete information about products advertised on:

Page..... by.....

Page..... by.....

Page..... by.....

Name.....

Address.....

.....

Position.....

Organization..... MAY 1953

New products and manufacturers' booklets reviewed in *Western Industry* are screened and selected for your needs. The advertisers in *Western Industry* call your attention to important services and developments available to Western firms in this period of dynamic growth. Take this opportunity for aid in keeping your business in step with this growth.

YOUR REQUEST on a POSTCARD

will result in our prompt and thoughtful action.

There is no obligation to you for this service.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 3755, Sec. 34.9, P. L. & R., San Francisco, Calif.

WESTERN INDUSTRY

609 Mission Street

San Francisco 5, Calif.

36

"Hardening with Surface Standard Rated Furnaces"

. . . is title of a new illustrated bulletin released by *Surface Combustion Corp.* Gas-fired, batch type hardening furnaces are featured. Direct-fired, horizontal hearth types and circular and rectangular salt pot types are included. Also shown is a complete line of controlled atmosphere equipment for hardening. SC-161

37

Insulation control charts for rapid calculation

Insul-Mastic Corp. of America, maker of a spray-applied cork and Gilsonite mastic insulation, has a four-page folder containing charts showing exact degree of protection from condensation afforded by insulation known as Insul-Mastic Type "D."

38

"Modern Steel Bolting for Piping and Pressure Vessels"

In this bulletin, comments on each ASTM specification are given plus tables on compilation of properties and bolting selection. Also included is a discussion on behavior of bolted, flanged connections of types used in piping and pressure vessels. *Taylor Forge & Pipe Works.* 524

39

Folder describes four-section straight lever motor truck scales

An eight-page two-color folder, just released by *The Howe Scale Co.,* illustrates and describes complete line of modern, heavy-duty Howe four-section straight lever ball-bearing motor truck scales for weighing big truck and trailer loads. Exclusive Howe features are reviewed. Complete specifications and pit dimensions are listed. 678

40

To operate vertical turbine pumps without electricity

An attractive 8-page bulletin in full color describes, in detail, a new Hollo-shaft gear drive which will operate vertical turbine pumps where electricity is not available. Cut-open views shows many new features. Published by *U. S. Electrical Motors, Inc.*

41

Better business by filing

Two booklets, published by *Remington Rand Inc.,* emphasize importance of selecting proper filing system to suit needs of a given business. Filing analysis and installation experts are offered to help select system and to make it produce as it should. LBV-395C.1 BSD-2

USE RIP-OUT POSTCARD for more information on products introduced this month.

NEW MATERIALS & EQUIPMENT

42

Combination of automatic and manual control valve has power

A new combination automatic and manual control valve, models 1520 SMW and 1560 SMW utilizes advantages of powerful Domotor control unit plus versatility of handwheel operation. Side-mounted handwheel mechanism answers field demands for convenient and positive supplementary control during start-up periods, or when system is shut down temporarily for instrument repair. *The Annin Co.*

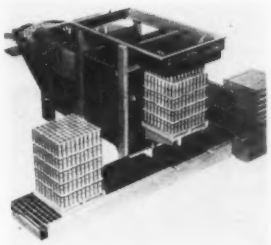
43

Crane eliminates swinging of hoisted loads

Tramrail stabilized crane is an important development in materials-handling. Eliminating usual swinging of a load being hoisted or transported from one area to another, this crane will help in speeding tank-dipping operations, in various assembly operations, in supporting traveling X-ray equipment. It makes possible delivery of hot metal in a foundry by an automatic dispatch method direct from cupola to molding area. Cleveland Tramrail division of *The Cleveland Crane & Engineering Co.*

44

Speedy unstacking of tin cans with this pallet unloader



Here is an innovation in gentle, high-speed unloading of palletized bright cans for labeling. FMC Stackmatic pallet unloader, employing principle of electro-magnetic pickup, efficiently unstacks loaded pallets and single-files cans in proper position for labeler. Depending upon can size, 1,200 cases or more per hour may be unloaded. *Food Machinery and Chemical Corp.*

45

Shipping room analysis offered

Available to any manufacturing concern on Pacific Coast is a new shipping room systems and practices analysis given personally by staff consultant of Martin Brothers Box Co. Procedure is undertaken by Martin Bros. with no charge, and consists of sending a consultant by appointment to manufacturer's premises. Here he reviews procedure, paper work, conformity with tariff and other regulations and often unearths more economical practices. *Martin Brothers Box Co.* produces wirebound crates and boxes.

46

New idea in hose fittings

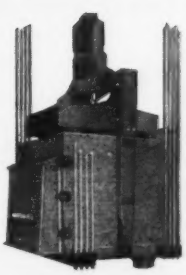
"Little Gem" hose fitting operates on a different principle of sealing fluid inside of hose. Reinforcing braid of hose is clamped, while fluid-tight seal is accomplished by separating inner tube from braid and using it as a "lip"

BETTER QUALITY EQUIPMENT FOR THE FOOD PROCESSING INDUSTRIES

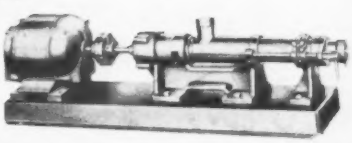
COMBS SIFTING MACHINES

These machines are used for the sifting of: starch, cocoa, abrasives, alfalfa, wheat, corn, sugar, flour, and many other dry or moist materials. They are made four, six or eight sieves deep for various capacities and separations, and materials sifted can be cleaned, aerated and fluffed. The motor and all working parts being above the sieves, it is *impossible* for the material used to damage same.

Low maintenance costs and enormous capacity are distinctive features of these wonderful machines, and actual use has proved them economical and successful in *reducing* production costs, which accounts for their universal popularity.



R & M MOYNO PUMPS



This pump pumps *everything*—even highly viscous fluids, pastes, suspended solids — in uniform flow *without* pulsation. Lumpy materials are delivered with virtually no disintegration, yet with ample pressure to discharge through screens or filters. Moynos are made of all stainless steel and combine outstanding self-priming performance with *positive sanitation*. The smooth contours of the "progressing-cavity" pumping element have no crevices within which bacteria can lodge and thrive, and the entire unit may be quickly dismantled for thorough, *effective* cleaning. No other pump is like the capable, *low-maintenance* Moyno. It does everything well—works where *nothing* else will, and will save you money many ways.

"CALL FERNHOLTZ FIRST" FOR COMPLETE INFORMATION

FERNHOLTZ MACHINERY CO. 8468-W MELROSE PLACE LOS ANGELES 46, CALIF. • WEbster 8-5145

CBS
FLAT DIE FORGINGS
Carbon and Alloy Steel; Aluminum
Bar Stock and Shapes
1500 lb. & 7500 lb. Open Frame Hammers
CBS
STEEL & FORGE
3321 E. Slauson Ave. • Los Angeles 58 • LA 0147

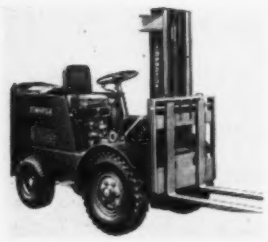
CBS
PRESS FORGINGS
Carbon and Alloy Steel; Aluminum
1200 Ton Maxi; 350 Ton Hydraulic
1500 Ton Hydraulic (now being installed)
CBS
STEEL & FORGE
3321 E. Slauson Ave. • Los Angeles 58 • LA 0147

CBS
DROP FORGINGS
Carbon and Alloy Steel; Aluminum
4000 lb. and 6000 lb. Drop Hammers
Electric Forging Furnace Facilities
CBS
STEEL & FORGE
3321 E. Slauson Ave. • Los Angeles 58 • LA 0147

seal in an annular chamber. Main advantage lies in reduction of compression of rubber or rubber-like inner tube which prolongs fitting's life. *Aeroquip Corp.*

47

Extra traction for lift trucks



A special "NoSpin" differential designed to give full power to both drive wheels under any operating conditions is now ready for both purchasers and present users of Towmotor Model LT-60 lift trucks. In addition to maintaining equal drive-wheel speeds, this differential compensates for differences in wheel speeds when turning in either direction. *Towmotor Corp.*

48

Truck unloader cuts delivery costs

Superlite unloader is an ingenious mechanical contrivance which is said to cut delivery costs by 50 per cent or more. It can be mounted on any standard truck or trailer and can be bridged for operation. Carriage rolls easily when fully loaded, propelled by hydraulic power through positive chain drives. *Builder's Equipment Co.*

49

Truck saves handling time

More payload plus faster loading and unloading are two advantages claimed for White Model 3022 truck. Because of special method of weight distribution, this unit can haul 12 cubes of 8 x 4 by 16 building blocks, instead of eight or ten cubes ordinarily carried. A special hydraulic hoist saves handling time—unloads in 18 minutes a job that formerly took seven man hours. *Builder's Supply Corp.*

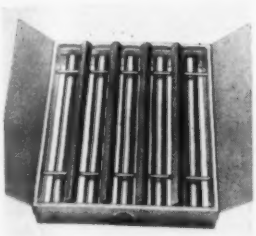
50

Surface grinder expedites tool room operations

Design and construction of Model D6 grinder is aimed at centralizing complete control over dimensional size and protection of work piece from grinding heat. Work of grinding is done to dimension according to feedwheel calibrations set by operator. During operation, point of cut as well as entire work piece is kept cool through a unique coolant system. *The DoAll Co.*

51

Non-electric grate magnet removes iron contamination



A permanent, non-electric grate magnet for removal of iron contamination from free-flowing materials may be incorporated in hoppers, floor openings, and wherever space limitations prevent use of larger equipment. Product is said to assure product purity, protection of machinery and elimination of fires and explosions. Unit is easily cleaned. *Eriez Manufacturing Co.*

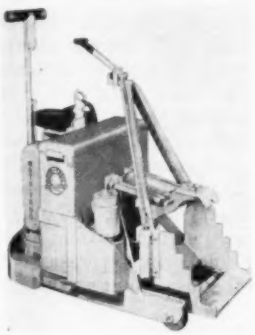
52

Rubber-impregnated leather developed for packing

Rubber-impregnated VIM 1243 Type 3 leather packing is a pre-set, scientifically proportioned, non-porous packing with advantages over both synthetic rubber and wax impregnated leather cups. Product combines longer life and lower friction of leather with non-porosity, high resilience and heat resistance of synthetic rubber. It is pre-vulcanized, pre-cured and has high dimensional stability. *E. F. Houghton & Co.*

53

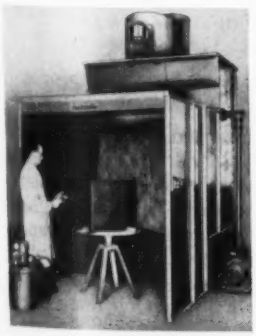
Tractor designed for moving 4-wheel trailers



"Grip-all" tractor, with new electric-hydraulic clamping design, is made for moving four-wheel trailers or containers. Lower "toothed" clamp can be adjusted in or out depending on position and height of container or hitch, upper clamp comes down and grip is completed. Over-all dimensions are 27 in. wide by 48 in. long. *The Moto-Truc Co.*

54

Spray painting booth that is easier to clean

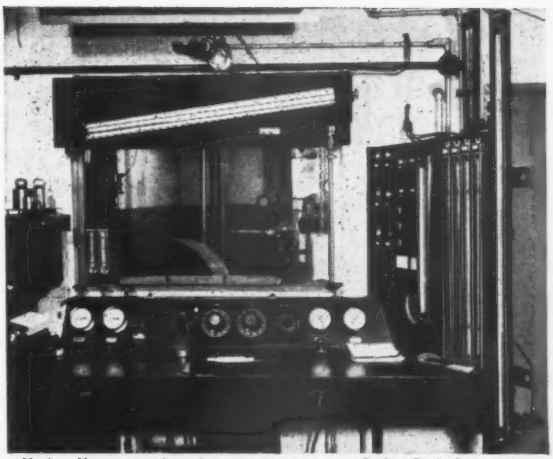


Every paint collecting surface in this dynaprecipitor unit gets a continuous water scrubbing. Inspection is simplified since you can remove major sections of booth—such as front water curtain and rear distributing baffles—by hand. Resulting actions of scrubbing and impingement are said to make exhaust so free of pigment that booth far exceeds all safety and health requirements. *Binks Manufacturing Co.*

55

Wet pit vertical pumps are "packaged"

No longer must vertical turbine pumps be individually engineered for each installation. Now, "Unit-Line" pumps



Meriam Manometers in an instrumentation room at Perfect Circle Corporation, Hagerstown, Indiana, one of the world's foremost makers of piston rings.

Perfect Measurement at PERFECT CIRCLE by MERIAM MANOMETERS

• At Perfect Circle Corporation, Meriam Manometers measure various pressures and pressure differentials — functions of air flow, fuel flow, oil flow, crank case pressure, exhaust back pressure, water flow, and similar variables encountered in internal combustion engines while testing piston rings.

Meriam Manometers are specified in nine engine test cells at Perfect Circle Corporation because they can be applied to very low pressure differentials and because of their inherent accuracy, sensitivity and independence of mechanical failure.

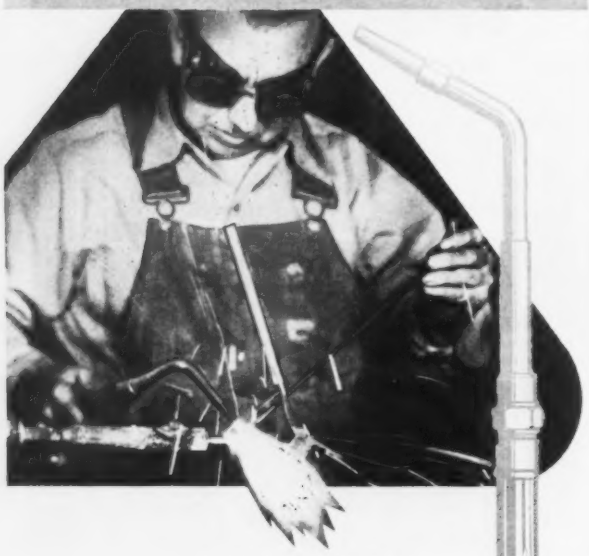
If your instrumentation problems are complicated by varying ranges of pressure differentials, possibly the answers are Meriam Instruments. They are primary standards for indicating measurements of pressures or flows of liquids or gases.

We shall gladly share our more than 40 years of experience. Request Bulletin C-12.

THE MERIAM INSTRUMENT CO.
10988 Madison Avenue • Cleveland 2, Ohio
WESTERN DIVISION: 4760 E. OLYMPIC BLVD., LOS ANGELES 22, CALIF.
IN CANADA: PEACOCK BROS., LTD., MONTREAL

MERIAM Instruments
ESTABLISHED 1911
MANOMETERS, METERS AND GAUGES FOR THE ACCURATE MEASUREMENT OF PRESSURES, VACUUMS AND FLOWS OF LIQUIDS AND GASES

The man on the job...



wants VICTOR'S Versatility!

This man with a VICTOR torch welds mild steel extension handles onto high carbon pliers—a small and ticklish job. The same torch, by simple change of nozzles and tips, can be quickly converted to new job needs, such as welding large castings, heating, brazing, descaling, flame priming, soldering—or to cutting, by addition of cutting attachment.

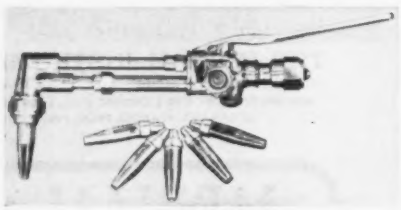
VICTOR's precision-built apparatus also gives you better flame control, saves gas, gets work done faster. Ask your VICTOR dealer for an on-the-job demonstration NOW

LOOK FOR THE VICTOR DEALER SIGN!

Ask him to show you why it costs less to own and operate VICTOR.

Dealer inquiries invited.

VICTOR
Welding and Cutting Equipment since 1910



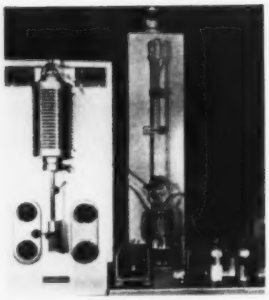
Model 2450 Cutting Attachment for VICTOR 300 Series Welding Torches cuts metal up to 8" thick.

VICTOR EQUIPMENT COMPANY
3821 Santa Fe Ave. LOS ANGELES 58 | 844 Folsom Street SAN FRANCISCO 7 | 1312 W. Lake St. CHICAGO 7

can be ordered by model number from simple head-capacity selection charts. Pumps are pre-engineered to conditions of wet pit or tank operation, made in graduated sizes, and shipped completely assembled and crated. Shaft sealing tube and special throttle bearing eliminate packing glands —a major maintenance problem in most pumps. *Johnston Pump Co.*

56

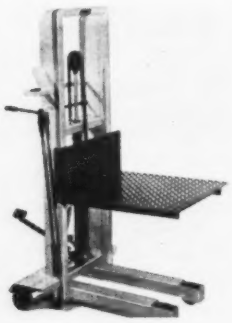
Radio heating measures iron and steel quality



Carbon and sulphur content in all types of ferrous alloys can now be determined in ten minutes by means of a new radio frequency inductive heating unit capable of temperatures above 3,000 deg. F. Heat is generated only in relatively small metal samples. Thus tubes, crucible, and other adjacent parts are heated only by conduction or radiation from small masses. *Lindberg Engineering Co.*

57

Better Big Joe lifts



Functional improvements in new models of Big Joe hydraulic lifts for manual or battery operation increase ease of handling bulkier loads with greater safety. Features include: straddle type base furnished in a range of widths up to 50 in.; forks, adjustable to any position, furnished in lengths from 25 in. to 36 in.; swivel casters at rear and roller bearing wheels in front; dual ground gripping brakes. *Big Joe Manufacturing Co.*

Use rip-out postcard for more information

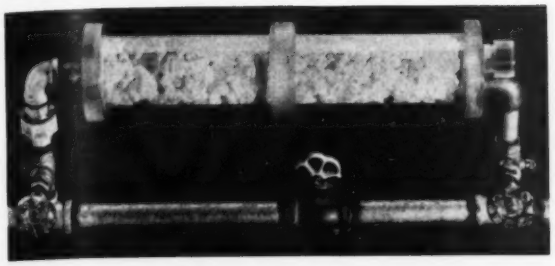
58

Wet blasting machine is efficient for small pieces

Model 30 Liquamatte is intended for precision cleaning and finishing applications involving small pieces that can be lifted and handled manually. Tolerances of .0001-in. can be maintained. Push button controls are located on one central panel convenient to work station. Machine has a blasting compartment 30 in. square and 2 ft., 7 in. high with one vertical sliding door. *American Wheelabrator & Equipment Corp.*

59

Clear out rusty water



Rusty water, caused by rust in tanks and pipes, can now be inexpensively eliminated through use of Aqua-Clear crystals and feeder. Product works by forming a pure, transparent, microscopically thin protective film on inner surfaces of tanks and pipes which prevents water from ever coming into actual contact with metal. Thus it holds rust in check, stops further rust, and keeps any present rust from discoloring water. *Sudbury Laboratory.*

60

An "Octopus" for materials handling

A 4,000-lb. capacity fork lift truck outfitted with a special carriage and attachments to handle nearly a dozen different types of loads is a new development for materials-handlers. According to company, this "Octopus" will perform all of these functions: handle ordinary pallet loads; work as a side-shifting truck to spot loads in tight areas; haul and stack drums and paper rolls, using its clamps; dumps, hauls and stocks tote-box loads; picks up a variety of pallet sizes after automatically adjusting for proper fork-spacing; empty drumloads of bulk material by hydraulically tilting drums in a vertical plane; lifts bales of cotton and crude rubber with a new spike-clamp attachment. *Baker-Raulang Co.*

61

Signal alarm unit for modern flow line and graphic panels

Monolarm offers you instant flashing-light warning against any abnormality that occurs in a processing operation at any time. Device takes up minimum space on front and back of panelboards. Its narrow bezel and compact box is especially valuable wherever instrumentation space is at a premium. *Russell & Stoll Co., Inc.*

Have You a LUBRICATION HEADACHE?

Solve it Quickly With

MOTOR MICA

TRADE MARK REG. U. S. PAT. OFF.

ANTI-FRICTION COMPOUND

(IN WHITE POWDERED FORM)

Motor Mica can put an end to your lubrication problems. Try it with your cutting oils, in die-casting, deep-drawing, metal stamping, etc. Works wonders in screw machine, punch-press and other operations. Cools Hot Bearings. Write on your business letterhead for free sample. No obligation.

Packed in 5-10-25 lb. containers.

A Little Goes A Long Way!

Keeping the Wheels of Industry Cool Since 1914

SCIENTIFIC LUBRICANTS CO. 3469 N. Clark St. CHICAGO 13, ILL.

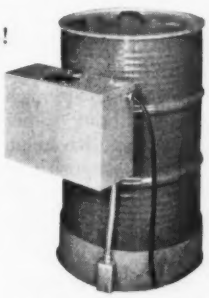
New LOW COST

VAPOR DEGREASER

Vapor degreasing is now possible in low cost equipment with the development of the BARONET BARREL DEGREASER.

CHECK THESE FEATURES!

1. Large unobstructed work area—23" diameter, 18" vapor depth.
2. Standard 50-gallon barrel work chamber.
3. Only 5 gallons of solvent required for operation.
4. Air cooled condenser eliminates all water connections.
5. Condenser design allows automatic reclaiming for dirty solvent for re-use.
6. Thermostatic control provides safety of operation.



Price $187.50
F.O.B. LOS ANGELES

The BARONET supplied complete with 2-kw. electric heating unit, condensing chamber, cover, thermostat and 15-ft. cord.

BARON INDUSTRIES
of California
241 West Avenue 26 Los Angeles 31, Calif.

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA

CIRCL-LITE CX-1000S

SKYLIKE

for school lighting

CLASSROOM
OFFICES
CAFETERIA
AUDITORIUM

COLLEGIATE PM-284

HAVE EASTMAN GEAR System Tags TO YOUR PRODUCTION

Modern industry uses "tags" in all production operations... Eastman specialists have the know-how to gear SYSTEM TAGS to every operation in your plant...

✓ For Greater Efficiency
✓ To Save Time
✓ To Cut Costs
✓ For Your Profit

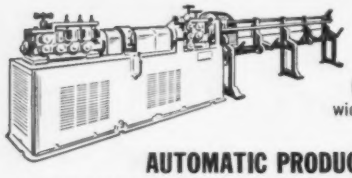
CALL OR WRITE OUR NEAREST OFFICE - GET SAMPLES - HAVE AN EXPERIENCED "TAG-MAN" SHOW YOU HOW SYSTEM TAGS CAN DO A JOB FOR YOU.

EASTMAN TAG and LABEL COMPANY

SAN FRANCISCO 7 · OAKLAND 12 · SACRAMENTO · SAN JOSE · FRESNO · SAN BERNARDINO
LOS ANGELES 1 · SAN DIEGO · PHOENIX · KANSAS CITY · HONOLULU · SALT LAKE CITY 1
DENVER 6 · SEATTLE 22 · TACOMA · PORTLAND 5 · SPOKANE 4

3 FACTORIES IN THE WEST — GIVES SERVICE THAT'S BEST

WIRE & WIRE CLOTH
FOR EVERY PURPOSE



All Types of Round and Flat Wire Straightened and Cut on Our Precision Cutting Equipment, Affording you a wide range of sizes and lengths.

AUTOMATIC PRODUCTION MACHINES
CUSTOM WIRE FORMING • BALE TIES
Wire Spooling and Coiling • Wire Braid
½ lb. - 1 lb. - 5 lb. - 10 lb. Spools or Coils

WIRE BRITE BASIC • GALVANIZED • ANNEALED • STONEWIRE

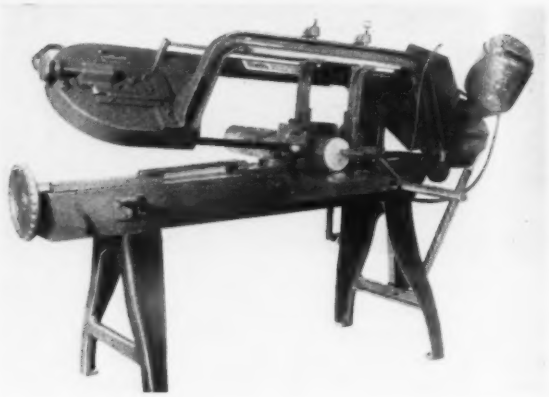
WIRE CLOTH & SCREEN
Complete Warehouse Stock
Steel • Steel Space • Brass • Bronze • Monel • Aluminum • Copper
Galvanized • Stainless Steel • Galvanized Hardware Cloth • Filter Cloth
Screens in All Meshes 1 to 325
Disc and Circles 5/32" to 20" Diameter
Cut or Punched to Your Specifications

POULTRY NETTING • WELDED FABRIC • NETTING

ENGINEERING SERVICE
INDUSTRIAL Wire PRODUCTS CORPORATION
5649 ALHAMBRA AVE. • LOS ANGELES 32 • CA 2-7131
431 WESTWOOD DRIVE, PL 5-5463 — SAN ANTONIO 10, TEXAS
4868 PINE ST., HO 9-3753 — LA MESA, CALIFORNIA

62

Band saw uses high speed steel blade



This horizontal band saw employs to good advantage new "Milford Rezistor" high speed steel band saw blade. Design features which distinguish Model 800 band saw include: heavy duty counterbalance frame and beam; new style band wheels providing for use of 1 in. wide blades; new "constant-load" blade tensioning device; and synchronized speed blade cleaning brush. *Wells Manufacturing Corp.*

63

Precision drill grinder for small LH and RH drills

"Meteor" type KBS grinder solves problem of resharpening small drills from .008-in. to .120-in. diam. It is claimed easy to operate, even for unskilled help. One precision 4-jaw chuck covers entire work range. Point angle is adjustable from 90 to 140 deg. Microscope, work lamp and diamond wheel dresser are supplied with machine. *Carl Hirschmann Co.*

64

Jo-Bolt for greater operational efficiency

Jo-Bolt is a flush blind bolt which, according to firm, develops shear strength equal to 160,000 psi. heat treat bolts, and about 85 per cent an. bolt tensile strength together with positive clamping action. It is also said to combine flushness, positive clamp-up, high vibration resistance and positive means of inspection—all principal features sought in a fastener. *Lok-Fast, Inc.*

65

No compressor needed for electric spray gun

Here is a spray gun ideal for a wide range of industrial uses. Suitable for work including painting, refinishing, touch-up work, rust-proofing, etc., unit delivers over 90 lbs. of pressure at 7,200 strokes per minute. Just plug into AC outlet and use. Gun has trigger action, is lightweight, yet is made for heavy duty. *Waldorf Sales Co.*

66

Carbon dioxide extinguishers feature squeeze-type valves

Fyre-Freez portable extinguishers using Kidde lightweight cylinders and squeeze-type valve, require only normal hand pressure for actuation after safety pin is removed. Recharging is done by simply squeezing valve open to permit recharge gas to enter cylinder. Units come in five sizes—2½-, 5-, 10-, 15- and 20-lb. models. *Walter Kidde & Co., Inc.*

67

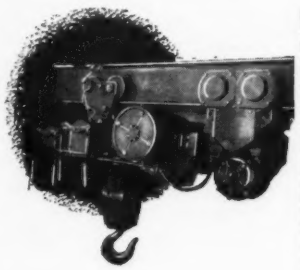
Permanent magnetic rolls work without current

Here are non-electric concave and straight magnetic rolls with high surface strength designed to cut time and labor costs of handling pipe, rods, angles, etc. They use no current, require no wiring, and only minimum maintenance. Magnetic strength is guaranteed permanent for unit's life. Rolls come either concave or straight faced. *Dings Magnetic Separator Co.*

68

Air clutch for heavy-duty service

Fawick type VC air-ring clutch is completely ventilated rigid type providing for transmission of power from friction shoes through torque bars to metal side plate of assembly.



keep production materials moving with

ELECTROLIFT WORM DRIVE HOIST

Safer, smoother, faster action features of ElectroLift will keep your materials and loads moving economically. One-man, quiet operation. Wide selection of speeds, capacities and controls.

For further information consult your ElectroLift representative listed in telephone directory.

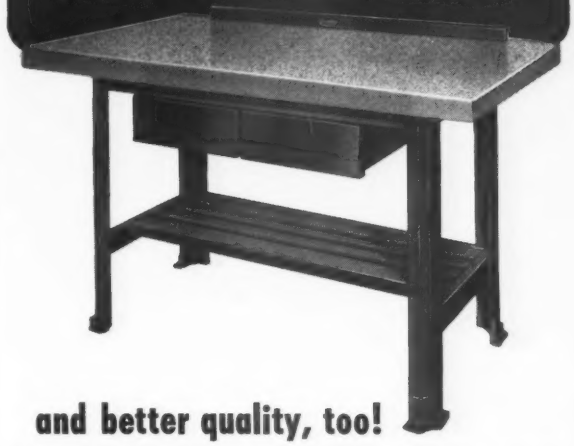
WORM DRIVE ELECTROLIFT HOISTS

ElectroLift, Inc., 30 Church St., New York 7, N. Y.

Through modern design . . .

WORK BENCHES

at savings of up to **40%**



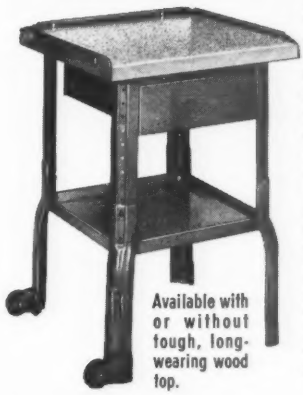
and better quality, too!

New Sturdi-Bilt exclusive patented "Tension Bolting" revolutionizes work bench construction! Assures rigid, vibration-free frames, economical shipping, mass production and low cost. New type Sturdi-Bilt tops are warp and splinter-proof, dent and abrasion resistant, have twice the hardness of hardwoods, adjustable legs. Available with or without drawers in four sizes. For full details, specifications, prices, write for special Bulletin No. 336.

USED AND APPROVED BY LEADING COMPANIES

Both Sturdi-Bilt work benches and the Shop Tender are being ordered and re-ordered in ever-increasing quantities by the Blue Book of American industry.

Versatile "Shop Tender"



Available with or without tough, long-wearing wood top.

Here's the perfect all 'round auxiliary bench. Mobile, convenient, sturdy, low cost—saves hundreds of steps; speeds up work and production. Adjusts to nine different heights. Has handy tool tray and steel drawer. Lower drawer and top frame are "Tension Bolted" for permanent rigidity. Available with wood top (24″ x 24″ x 1⅝″) with drop sides and back—or steel trays; 3″ diameter hard rubber wheel sets or caster sets. Choice of 12 models. For full details, specifications, prices, write for special Bulletin No. 336-B.

STURDI-BILT STEEL PRODUCTS, INC.

CHICAGO 5, ILLINOIS

Contact Your Nearest Dealer

A. J. Glesener Co., Inc.
San Francisco, Calif.

C. W. Marwedel
San Francisco, Calif.

Production Tools, Inc.
San Diego, Calif.

Southwest Supply Co., Inc.
Los Angeles, Calif.

Garrett Supply Co.
Los Angeles, Calif.

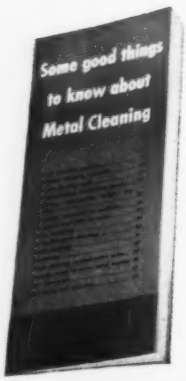
Colson Equipment & Supply Co.
Los Angeles, Oakland and San Francisco, Calif.

HOW DO YOU PUT A HEAVY PHOSPHATE COATING ON 90 MM. SHELLS?

HOW CAN WE GET BETTER ELECTROCLEANING AT LOWER COST?

Our 200 Oakite Technical Service Representatives answer questions like these every day. We thrive on questions about tank cleaning, machine cleaning, electrocleaning, pickling, preparation for painting, paint stripping, steam-gun cleaning, burnishing, rust prevention and related subjects.

Send us your questions on metal cleaning. There's no obligation. We'll be glad to advise you the best way we can.



FREE Also ask for our 44-page illustrated booklet "*Some good things to know about Metal Cleaning.*" Just write to Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. and Canada

For precision springs in a hurry...

call Connor

• Our business has been built on close, personal attention to the needs of our customers.

Sometimes it takes extra effort—overtime, special scheduling of work or even holding a machine idle for hours—to meet the time schedule or the specifications required. But if it can be done at all, our customers get the springs they need *when* they need them.

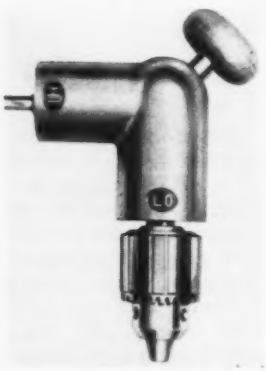
We are fully staffed and equipped to give you fast, efficient service on *all* your spring needs.

CALL CONNOR
CONNOR SPRING Manufacturing Co.
SAN FRANCISCO 3 • LOS ANGELES 37
Precision Springs and Wire Forms

Unique design features are said to include: cooler operation inherent in drum clutch design plus isolation of operating tube from heat-generating friction surface; riveted, replaceable friction lining; and loose, expanding operating tube which can be replaced without removing clutch from shaft. *Federal Fawick Corp.*

69

Right angle drill attachment and super speed bits



Now, according to makers of R.C.S. Super Saw, you can drill a 2-9/16-in. hole through hardwood with a ¼-in. heavy duty drill with R.C.S. Korner King (angle attachment) plus R.C.S. Super Speed Bits. Use of these two items will increase versatility of any heavy duty ¼-in. electric drill. Angle drive triples range of drills by adding two more speeds to operation. Bits feature patented, curved cutting blades to do a faster boring job. *R.C.S. Tool Sales Corp.*

Use rip-out postcard for more information

70

Counterbalance cylinders for any power press gives smooth action

An easy installation can be made on punch press, power brake or similar equipment with this line of power press counterbalance cylinders. Cylinder serves as a brake, similar to a door check on a door, not only eliminating over-riding of ram on mid-stroke, but absorbing percussion blow of presses when punch section of die breaks through blanking operation—thus assuring longer die life. Line is made in sizes from 5 in. to 12 in. for practically any power press stroke or adjustment. *Dayton Rogers Manufacturing Co.*

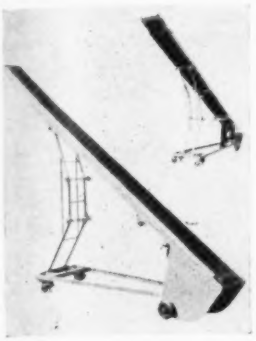
71

Device safety-tests electric tools and cords

By simply pressing buttons of Pow-R-Safe tool-tester, safe working condition of such electric hand tools as drills, screw-drivers and soldering irons can instantly be determined. Complete tests are performed in less than 10 seconds, and preliminary tests are conducted at a safe 6 volts to avoid electrical shock to operator if tool is faulty. Simple operation permits untrained persons to conduct tests efficiently. Weighing only 6 lbs., unit is completely portable. *Fendall Co.*

72

Portable conveyor for balconies



Special Model SLJ-40 Speedlift, Jr., a new portable power belt conveyor, is particularly suitable for loading and unloading from balconies, mezzanines and upper floors. This operation is possible because of an undercarriage construction permitting overhang. Easily maneuverable in either horizontal or inclined position, this model adjusts to any angle. *Speedways Conveyors, Inc.*

73

Mark off your danger areas permanently

Special smoking or danger areas can now be marked off permanently with brilliant fire-engine red Dur-o-line plastic aisle marker. Previously available only in yellow or white, these markers are used in factories, warehouses and highways to replace painted lines. Easily put down on any type floor, markers provide a permanent line requiring no further attention. *Traffic Safety Supply Co.*

74

Radial arm cutting machines are re-designed

A three-inch longer radial arm and a work table that is three inches wider and four inches longer are major changes in new design of "Power Shop" wood working machines. These enlargements permit machines to rip clear to center of a four-ft. panel. Operational controls are now more convenient, more easily visible to operator, and simpler to manipulate. *DeWalt, Inc.*

75

New line of screw drivers

A new line of screw drivers features best selling patterns in round blades, square blades, Phillips style and stubbies. Blades are made of SAE6150 chrome vanadium electric furnace steel, handles of amber shockproof tenite II. Blade lengths range from 12 in. to 1¼ in. *Utica Drop Forge & Tool Corp.*

76

Magnetic modulator converts DC to AC signals

F5A magnetic modulator, now available for general industrial use, is designed for accurate and stable conversion of low-level DC signals into proportional AC signals more suitable for electronic amplification. Device will utilize signals from thermocouples, strain gauges, certain computing devices, and a multitude of other industrial instruments. *Lear, Inc.*

WRITE FOR FREE Hassall decimal-equivalent wall chart

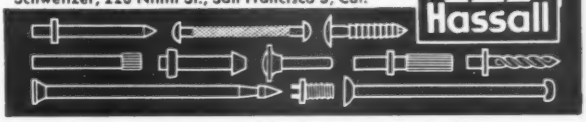
In such popular demand (we've given away 50,000) — we've made it better. The new chart is far easier to read! In three colors to automatically signal decimal-equivalents of fractions. The special products which frame the chart are a constant reminder of a good source for cold-headed parts.

ESTABLISHED 1850

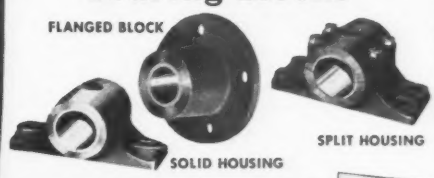
JOHN HASSALL, INC.

424 Oakland Street, Brooklyn 22, New York
Los Angeles Representative: C. W. Warren Co. 646 N. Fuller Avenue, Los Angeles 36, Cal.; San Francisco Representative: Albert M. Schweitzer, 228 Ninth St., San Francisco 3, Cal.

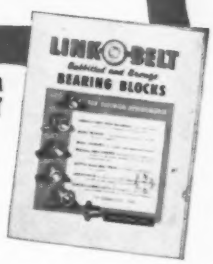
Hassall



Stock service on babbitted and bronze bearing blocks



For easy selection ask for Folder 2387



New Link-Belt Folder 2387 offers quick, easy selection of babbitted and bronze bearing blocks. Noted for long trouble-free service, babbitted bearing blocks are available in split or solid housings. And bronze bearing blocks are becoming popular throughout industry for applications involving higher speeds and heavier bearing pressures. Let Folder 2387 aid you in your choice. We will be glad to furnish complete information.

LINK-BELT

BABBITTED AND BRONZE BEARING BLOCKS 13.165-P

LINK-BELT COMPANY
PACIFIC DIVISION

Plants and Factory Branch Stores: San Francisco 24, Los Angeles 33, Seattle 4. Offices and Factory Branch Stores: Portland 9, Spokane 1, Oakland 7, Salt Lake City 1.

Die Cast Parts Like These...
Cut Costs... Speed Production

Die Casting is the modern, economical means for mass producing strong, uniform, and often complex parts better . . . at lower cost. Many manufacturers have found die casting, both on defense and civilian orders, to be an excellent method for increasing production and reducing unit costs by decreasing their material and machining requirements with clean, ready-to-assemble precision castings.

Rangers are well equipped with modern facilities, and engineering know-how to produce aluminum or zinc die castings of the highest quality on modern, high speed equipment. They are prepared to work with you on your production problems toward cutting costs and increasing production with the use of die castings from the design stage through to the finished part.

Investigate the money and time saving possibilities of die castings. Send blueprints or samples today for quotation.

"Member American Die Casting Institute, Inc."

RANGERS DIE CASTING CO.

10828 SO. ALAMEDA STREET, LYNWOOD, CALIFORNIA

MagLiner MAGNESIUM
DOCK BOARDS

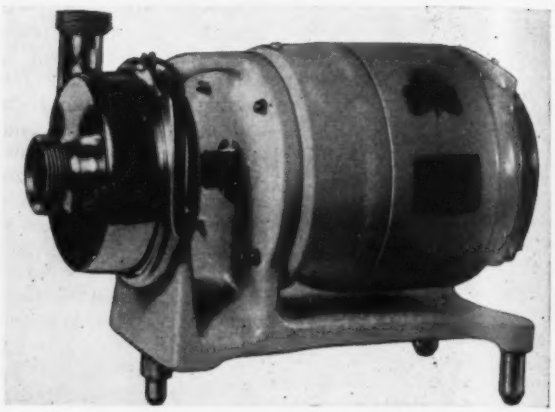
MAGNESIUM light! MAGNESIUM strong! Get the benefits of smoother, faster, more efficient loading! Eliminate loading accidents . . . lifting injuries! MAGLINER Dock Boards provide strength-to-spare for the heaviest of loads and equipment, yet are easily handled by one man. Before investing in any dock board, write for complete information. Standard and custom-engineered models.

WRITE FOR BULLETIN DB-203

MAGLINE INC. P. O. BOX 402 PINCONNING, MICHIGAN

77

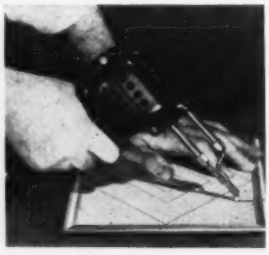
Centrifugal pumps resist corrosion



A new line of Tri-Clover corrosion-resistant sanitary and industrial centrifugal pumps will handle any liquid that will flow to them and are designed to give efficient transmission and low cost maintenance. They feature patented screw-type impellers with sanitary impeller clips, inert carbon seals easily removed for cleaning, streamline lightweight heads with a minimum of parts, and casing construction which permits fast pump assembly. *Tri-Clover Machine Co.*

78

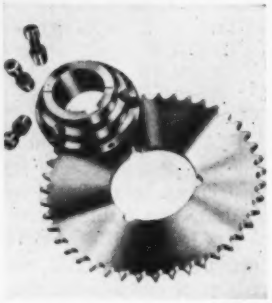
New tips increase versatility of electronic soldering iron



Two new tips, for use with "Quick-Hot" electronic soldering gun, greatly increase utility of that tool. "Feraloy" extra long life tip is ferrous coated to protect base copper against corrosion and silver plated to insure continuous good electrical contact and heat transfer. Another tip converts gun into a professional plastic cutting tool easily used to cut any odd or regular shape. *Wen Products Co.*

79

Advanced design in sprockets



Grip-master sprockets are said to have many advantages. They eliminate reboring, thus simplifying changes. Dependable for a wide variety of applications, grip-masters come completely packaged for convenience and speed with complete mounting instructions. *Cullman Wheel Co.*

80

New packaging product has unusual shock proof qualities

Compounded Polyvinyl Chloride (CPC) cushions or floats article that it protects. It can be formed or molded inexpensively in any shape to fit package. It can be molded

with a covering of cloth or other material on either side, can be bonded to any known surface, is fungus proof, and will not support combustion. Various grades in all colors are supplied and engineered specifically to article to be protected. *Calresin Corp.*

81

King boltless swivel caster

A new design principle used in manufacture of Dean Caster adds up to a swivel caster that does not need a king bolt. Swivel plate floating within a bearing assembly that carries both radial and thrust loads, promises longer caster life, reduced maintenance, and greater swiveling freedom under heavy loads and greater resistance to shock. *Lansing Co.*

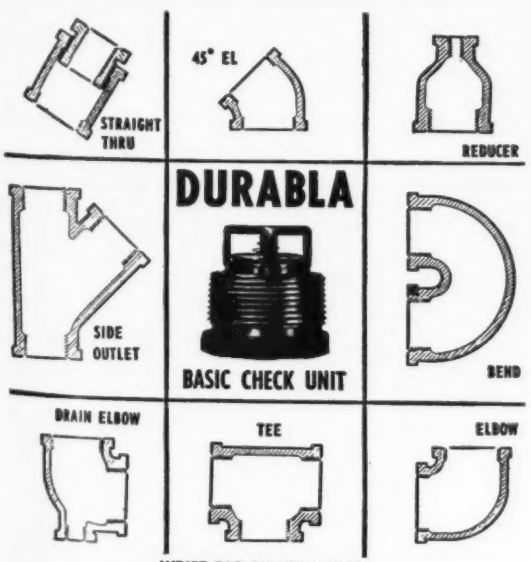
82

Pumping unit saves space . . . low in cost

Farval offers an automatic centralized lubrication system built around its DC-20 pumping unit. Though small and inexpensive, this rugged unit is capable of top performance under severe operating conditions. It dispenses either oil or grease and, for attention, needs only renewal of lubricant supply in reservoir. Parts, including ¼-hp. motor and V-belt drive are mounted on one common bedplate. *The Farval Corp.*

DURABLA CHECK VALVES

ONE BASIC CHECK UNIT ADDED TO ANY STANDARD FITTING BECOMES A COMPLETE CHECK VALVE



WRITE FOR BULLETIN 4W3

DURABLA MANUFACTURING COMPANY
114 LIBERTY STREET, NEW YORK 6, N. Y.

Get this Bulletin

With infinite variable speeds, The U. S. Varidrive Motor will boost your production, increase operator's efficiency and produce better quality work. 2 to 10,000 r.p.m. ¼ to 50 hp. Request new Bulletin.

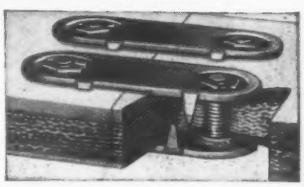
U. S. ELECTRICAL MOTORS Inc.
Box 2058, Los Angeles 54, Calif. Milford, Conn.

FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.



Compression Grip distributes strain over whole plate area

★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO.
4642 Lexington St., Chicago 44, Illinois

PEDIGREED PROTECTION!
...for workers' belongings!

BERGER MANUFACTURING DIVISION REPUBLIC STEEL CORPORATION CANTON OHIO

STEEL LOCKERS

Employee good-will is a most valuable asset in every industry. Build and keep it by equipping all locker rooms with safe, sturdy, efficient, sanitary, Berger all-steel lockers. Call a Petley engineer to help plan and install your new or enlarged locker facilities.

OTHER BERGER PRODUCTS:

Steel shelving, tool room equipment, office desks, files, tables, work benches, shop desks.

Representatives:
BERGER MFG. DIVISION
REPUBLIC STEEL CORPORATION

PETLEY INCORPORATED INDUSTRIAL AND AUTOMOTIVE EQUIPMENT ENGINEERS

899-73rd Ave., Oakland 3, Calif. Phone: TRinidad 2-7621
5424 E. Slauson Ave., Los Angeles 22 Phone: UNderhill 0-3327
Anglo Bank Bldg., Fresno, Calif. • Phone: 3-4849

Extra-Smooth Alignment...

...LOVEJOY

FLEXIBLE COUPLINGS

Soundly engineered, LOVEJOY Flexible Couplings provide maximum alignment correction for smooth power transmission. Vibration, starting torque and shock of intermittent loads are dampened and absorbed. Operational efficiency and economy is increased, motor and machine protected—their service life lengthened. The end result is not only a more profitable, but an improved finished product.

There is a LOVEJOY Flexible Coupling for every requirement. Cushions are made of materials best suited to the load conditions.

FACTORY REPRESENTATIVES

Mr. Walter H. Ostring, 1149 E. Pico Boulevard, Los Angeles 21, Calif.
Edward L. Parsons, 600 Sixteenth St., Oakland 12, Calif.
Chain Gear, Inc., 822 First Ave., So., Seattle, Wash.

Write today for Catalog and Handy Selector Charts

LOVEJOY FLEXIBLE COUPLING CO.

5092 W. Lake Street Chicago 44, Illinois
Also Mfrs. of Lovejoy Universal Joints and Variable Speed Transmissions

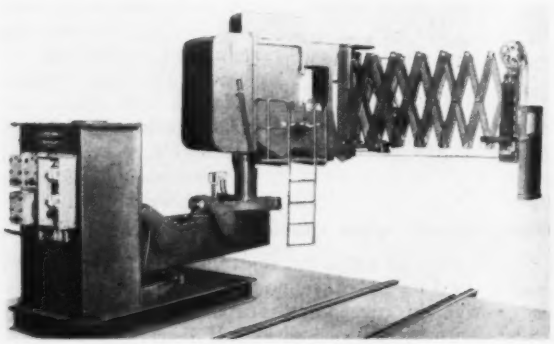
83

Vitrified bond improves performance of grinding wheels

Plant tests of an improved vitrified bond, "G-Bond," show extra good performance for cylindrical, centerless, surface, internal, gear, tool and cutter, form and thread grinding, and saw gumming. Abrasive grains are held by bond until they have accomplished their cutting job, then are released to make room for new grains with fresh, sharp cutting edges. G-Bond's ability to hold grains *just long enough* keeps grinding surface at peak efficiency. *Norton Co.*

84

Box car unloader operates between two tracks



An unloader is now available for operation between two tracks, making it possible to move directly from one car to another on an adjacent track. It is designed to handle practically all bulk materials up to 2-in. lump size handled in box cars. Unloader occupies an area of about 8 ft. by 24 ft. when not in use and requires only a single concrete footing for track-side mounting. *Stephens-Adamson Manufacturing Co.*

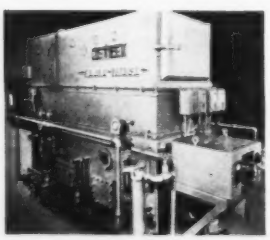
85

Bevel gears with Swiss type accuracy

Straight and oblique bevel gears, said to have precision quality unequaled by any other United States producer, are now being manufactured. This accuracy is attained by use of Type KS-42 gear grinder made by Maag Gear-Wheel Co. of Switzerland in conjunction with Type KP-42 gear tester. *Hall-Scott Motor division, ACF-Brill Motors Co.*

86

Ultrasonic waves clean metal



Detrex Soniclean Process features a man-made (transducer) element for directing sound energy as an advanced, practical method of metal cleaning. In this method, electrical energy is transmitted to ceramic transducer, converted into sound energy, and projected through a solvent at a frequency of 430,000 cycles per second. *Detrex Corp.*

87

Powder metal product is highly bendable

Steel Oilite is a new iron powder metal having improved ability to withstand high stresses without cracking. Ductility said to be several times that of previous iron

powder products makes possible material's use for finished machine parts—such as gears, cams, brackets and lever arms. Steel Oilite, according to firm, withstands up to 70,000 lbs. pressure per sq. in., is not brittle and may be bent or twisted without breaking. *Chrysler Corp.*

88

Tubeless truck tire is mounted on drop-center rim

A new truck tire which is tubeless and mounted on a one-piece, drop-center rim will, says firm, make changes of truck tires as simple and easy as mounting and demounting passenger car tires. Simplification of design allows use of a substantially lighter rim with no sacrifice in tire mileage or durability. Tractor trailer unit equipped with ten of these tires boasts an unsprung weight reduction of 360 lbs. *Firestone Tire & Rubber Co.*

89

Wider choice for lift truck users

Four new HiDuty lift truck models, "FLW" series, feature "freelift," permitting maximum fork lift weight without increasing collapsed weight. Complete line offers a choice of either Waukesha industrial engine or Crosley industrial engine —both liquid cooled four cylinder engines developing ample horsepower. Trucks also come equipped with dual lever controls. *Transitier Truck Co.*

90

Multi-purpose lifting machine for small shops

Fulfilling demand for an all-purpose hand truck in average plants, Hydrolift model HHL straddle-type stacker lays claim to these features: capacities to 2,000 lbs.; power hydraulic lift; 4-wheel stability; light in weight and highly maneuverable; stacking made easy inside of railroad cars or motor trucks; low initial cost and upkeep. *Lift Trucks, Inc.*

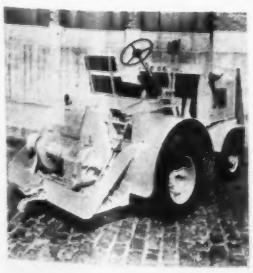
91

Floor resurfacing without delay

Redi-Roll is a heavy duty floor resurfacing and patching material that can be used with no time out for curing or setting. A plastic rather than a mastic material, it sets by compaction—not by curing. Ready for use as it comes from container, product may be applied over cement, brick, metal, etc. Traffic can roll over it immediately. *Rock-Tred Corp.*

92

Power winch attachment for heavy duty tractor



Heavy duty "Super-Huskie" gas tractor is now fitted out with a power-driven winch assembly having a 15,000-lb. capacity. For easy operation, assembly is located at a low elevation on rear of tractor. A transmission power take-off drives winch which is controlled through a specially designed linkage arrangement. *Mercury Manufacturing Co.*

SURETY'S SILVERTEX

TOUGH COATING for TOUGH JOBS

Laboratory tests and Industry use show:

- Better chemical resistance than rubber or standard synthetics.
- Silver coating reflects moderate heat radiation.
- Resists cuts and snags.
- Won't crack or peel with use.
- Curved finger design, swing thumb, all standard sizes, styles.

Write for complete information.

THE SURETY RUBBER CO. CARROLLTON, OHIO

H. A. MAC INTOSH—Sales Representative

WESTERN DIVISION
544 MARKET STREET, SAN FRANCISCO 4, CALIF.

REALOCK FENCE

means what it says

Realock Fence provides real locked-in protection for your grounds and property. All fittings have bolts placed so that nuts are removable only from the inside ...thereby insuring safety from intruders.

Realock Fence is heavily galvanized by a special process...gives weather-resistant, durable service year after year with little or no expense for maintenance. Expert erection service is conveniently available.

For additional information write our nearest sales office or consult your classified telephone directory.

EAST: Wickwire Spencer Steel Division, Buffalo, New York
WEST: The Colorado Fuel & Iron Corporation, Denver, Colorado
PACIFIC COAST: The California Wire Cloth Corporation, Oakland, California

REALOCK FENCE
THE COLORADO FUEL AND IRON CORPORATION
CF&I
BRANCHES IN ALL KEY CITIES

AMERICA'S LIGHTEST, TOUGHEST

TOTE BOXES

made from

U. S. ROYALITE

"Longer life cuts replacement cost"

- Non-splintering, warp-proof
- Self-nesting, self-stacking
- In colors for easy classification
- Adaptable to any type conveyor
- Water-proof, non-magnetic
- Alkali-acid-oil resistant
- Immediately available in stock sizes

STACKING TYPE NON-STACKING TYPE

PROTECT YOUR INVESTMENT

. . . *Avoid* costly spillage caused by flimsy containers.

. . . *Avoid* clumsy handling with heavy containers easily battered out of shape.

BLACKMAN IS TOTE BOX HEADQUARTERS

Write today for free folder, full specifications on U. S. Royalite tote boxes.

Ask also for new Blackman color folder on Formed Plastics. We offer complete production facilities, from design through final assembly, of parts made from plastic sheet materials... Royalite, Phenolics, Plexiglas, and the new Poly Vinyl Chloride, Boltaron 6200.

MANUFACTURERS OF FORMED PLASTIC PRODUCTS

Horace Blackman COMPANY 287 South Robertson Boulevard Beverly Hills, Calif. · CR 5-4541

BEST DEFENSE AGAINST CORROSION

Start with

TYGORUST

"the no-prep vinyl primer"

- minimizes surface preparation
- brushes easily—sprays beautifully
- dries hard in 5-15 minutes
- covers up to 500-600 sq. ft./gal.
- goes under any type finish
- adheres to wet or dry rusted steel, to wood, to concrete, or to previously painted surfaces.

Finish with

TYGON "Series TP" PAINT

"the vinyl finish of maximum protection"

- easily applied by brush or spray
- fast drying and non-oxiding
- fully flexible and chip-resistant
- non-flammable when dry
- easy to clean and long lasting
- resists fumes and spillage of acid, alkalies, oils, greases and water.

Write for full details—ask for Bulletin 720!

360 C

A product of U. S. Stoneware Co.
Local stock available

HERCO PRODUCTS 1311 WEST MAGNOLIA BLVD. BURBANK, CALIF.

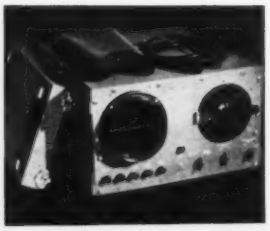
93

Phosphatizing material promotes paint adhesion

Oakite CrysCoat HC is a material that creates a complex zinc phosphate coating on steel and iron to promote excellent adhesion of paint to metal. Coating is crystalline and weighs from 200 to 1,200 milligrams per sq. ft., depending upon application and surface. It may be used in tanks and pressure-spray washing machines meeting these government specifications: JAN-C-490, Grade I; 57-0-2C, Type 2, Class C; and PA-PD-191 Rev. A. *Oakite Products, Inc.*

94

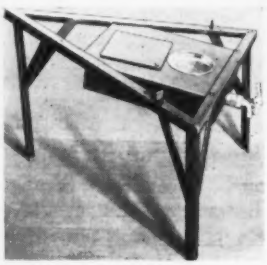
Analyzer locates power line faults



Sierra model 124 line fault analyzer shortens time, work and hazard of locating line faults. Operating from powerhouse, transformer bank or substation, it pinpoints shorts, grounds or open circuits at ranges from ½ to 200 miles. Instrument is direct reading and simple to operate. *Sierra Electronic Corp.*

95

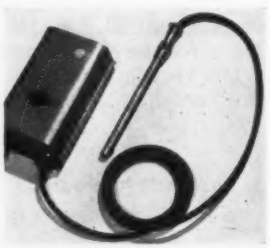
Tripod stand for dispensing oil



Now available is a tripod oil drum drain stand developed to recover the several quarts of oil which cannot be reached by a pump ordinarily used to dispense from a standard drum. In practice, stand holds an inverted standard 55-gal. oil drum in slanted position. Screened reservoir opening is protected by a sliding cover when stand is not in use. *West Bend Equipment Corp.*

96

Electronic device controls liquid levels



Based on capacitive action of liquid surrounding a porcelain enamel-covered electrode, Belmont Level Control provides adjustment of liquid level and cut-in, cut-out differential over very wide limits. Standard models operate from 115-volt, 60 cps. supply while special units are available for 230-volt or 25-cps. operation. Snap-action relay is rated for 10 amp. at 115 and 230 volts. *Thermo Instruments Co.*

97

Suspended gas fired units increase line of space heaters

Suitable for natural, manufactured, mixed, liquid petroleum, sewage or coke-oven gas, and available with input capacities ranging from 85,000 to 215,000 Btu. per hour, Model D unit heater comes with a standard fan, and Model

DB with a squirrel-cage blower for short duct runs. Model DD (without blower) is designed as a heating unit to be built directly into air-conditioning duct systems. Bunsen-type burner assembly is easily removable, mounted burners and controls are easily accessible. *Dravo Corp.*

Use rip-out postcard for more information

98

Here is a saw-able replacement for concrete

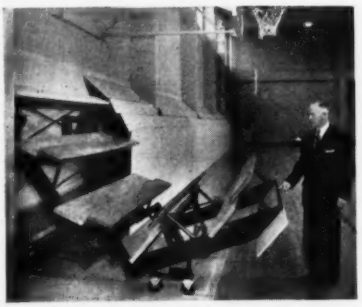
Zeprex, a Swedish development, is a versatile lightweight mineral building material. Replacing concrete in building superstructures, it can be sawed, drilled, cut with an axe, or nailed. Manufactured in slab form, Zeprex comes in 20-in. width and in lengths up to 18 ft. Depending on desired strength and insulation, thickness may vary from two to ten inches. *United States Plywood Corp.*

99

Pulpwood loader made for quick handling

A special tool designed for quick, efficient handling of raw pulpwood or small logs at concentration yard and receiving points, this loader consists of Hyster Model 150 lift truck plus a special boom attachment. Machine, with a 13,300-lb. loading capacity, has a short turning radius, high degree of maneuverability and an ingenious "split sling" that eliminates hazards in releasing load and speeds up work. *Hyster Co.*

FOLDING BLEACHERS save factory space



THE NEW Beatty Rollway Bleacher, a folding bleacher developed by Beatty Scaffolds, Inc., can be used in factory gymnasiums, and for training meetings. This design provides extra room so that spectators can sit in a normal position with sufficient knee room. Extra height between rows provides 30% better visibilities and the bleachers accommodate up to 40% more persons than other bleacher styles.

They provide anywhere from four to twenty-four rows of seats when extended, and fold up against the wall occupying space only 2 ft., 6 in. deep, thus freeing valuable floor space for other uses. One person can fold or unfold a 16-foot section in a few seconds' time, and floors are protected from marring by a plywood base on which the casters roll. In closed position the bleachers are completely covered by smooth plywood.

A word to the wise . . .

BECAUSE a Revolvator Go-Getter lift truck operator neglected to charge his truck's battery the truck stood idle and three men and a hand lift truck had to be called in to do the job of moving 6,000-lb. lead molds. This oversight exemplifies the value of preventive maintenance, and the economy of powered materials handling equipment.

Colstrip
COLD ROLLED STRIP STEEL
"THE WEST'S FIRST
COLD ROLLED STRIP MILL"
cut fabricating
PROBLEMS...
GET MORE FINISHED PARTS PER TON
The uniformity of gauge and hardness provided by Calstrip can be important to your fabricating methods. This precision cold-rolled strip steel often means more finished parts per ton with fewer rejects . . . better blanking and forming qualities . . . and minimum die wear. You get a fine surface finish too with Calstrip steel. It's tailored to your exact requirements in gauges from .010" to .125" in any width up to 13" . . . with round, square or dressed edges.
If you have surplus steel coils or have sizes that are obsolete for current production . . . let us convert it to your exact needs. We have the annealing, cold reducing and slitting facilities to do the job right here in our own mill.
Should you want technical help or more information about Calstrip Steel . . . just call UNderhill 0-1344.
Colstrip
STEEL CORPORATION
MILL AND OFFICES
7140 East Bandini Blvd., Los Angeles 22, Calif.

WESTERNERS AT WORK

Arizona

WILLIAM B. BIRREN resigns as plant manager of *Grand Central Aircraft Co.'s* Tucson division.

A. J. RAMBOSEK, formerly engaged in Montana mining industry, is appointed acting chief of *Atomic Energy Commission's* Phoenix office.

California

M. D. WHITE, previously of *California Packing Corp.'s* Sacramento plant, is appointed superintendent of company operations in Yuba City and Marysville. He succeeds JOHN TROXLER, transferred to San Leandro.

O. T. CUMMINGS is named superintendent of *Western Gear Works'* Belmont plant, transferred from firm's Lynwood plant.

ROLFE WYER, former supervisor of budgets and systems for *Solar Aircraft Co.*, now fills newly-created post of assistant plant comptroller of company's San Diego plant.

CHARLES T. FETTEL is promoted from general foreman, structural mill, *Kaiser Steel Corp.*, Fontana, to assistant superintendent of concern's merchant-skelp mill.

C. L. WARD, production manager of *Kimball Manufacturing Corp.*, San Francisco, molder of Fiberglas reinforced plastics, is elected vice president and director of firm.

C. L. Ward

E. L. Slagle

EDWIN L. SLAGLE, works industrial engineer of *The Columbia-Geneva division* (Pittsburg) of *United States Steel*, is nominated for position of Western region vice president of *American Institute of Industrial Engineers*.

PAUL J. LOVEWELL resigns as chairman of techno-economics research at Stanford Research Institute to accept post of assistant to president of *Gladding McBean & Co.* ALLEN S. DUNBAR, Institute's senior research engineer, joins *Dalmo Victor Co.*, San Carlos, as assistant director of research.

Andersen's Foods, Inc., Santa Barbara soup and dairy products manufacturer, names WINSTON A. CHURCHILL, formerly with *Avoset*, to post of director of production and research.

LOWELL E. MCLEAN resigns as personnel manager of *Contractors Mid-Pac*, San Francisco, to join *Holmes & Narver*, Los Angeles, as chief of industrial relations.

L. E. HOWARD, JR., previously with *Bank of America*, is elected director and secretary-treasurer of *American Pipe & Steel Corp.*, Alhambra. He succeeds CARL B. DAHLBERG, now vice president of sales. REAR ADM. R. A. J. ENGLISH, USN (Ret.), formerly president's assistant, promoted to vice president of production and engineering administration.

DR. E. E. LYDER is named consultant on refinery and petro-chemical plant engineering and operation for *Bechtel Corp.'s* industrial division at Los Angeles. He was general manager of *Standard Oil Co. of California's* El Segundo refinery until his recent retirement. DR. NATHAN SCHLECHTER joins Bechtel's engineering staff as a process design engineer in fields of petroleum refining and petrochemistry.

FRANK L. MCCLASKY joins *Air-Parts, Inc.*, Glendale, as superintendent of aircraft engine and accessory overhaul shops.

N. A. LAMBERTI upped to director of materials for *McCulloch Motors Corp.*, Los Angeles, from purchasing agent. L. S. PECK, formerly personnel manager, becomes director of industrial relations.

N. A. Lamberti

L. S. Peck

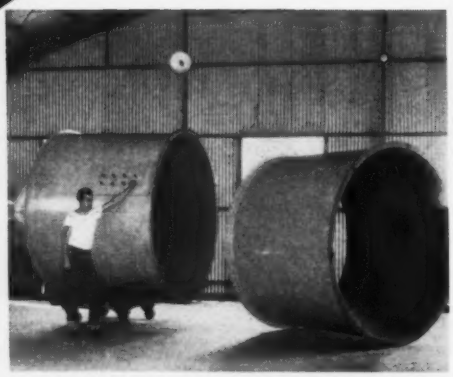
JOHN A. OWEN is named district manager of *Richmond-Chase Co.'s* Stockton operations. He was formerly vice president of *Pratt-Low Preserving Co.*, Santa Clara.

R. W. HAMMOND, formerly *Pacific Vegetable Oil Corp.'s* industrial oil division sales manager, is transferred to Los Angeles where he assumes presidential duties of firm's subsidiary, *California Flaxseed Products Co.*

P. T. SINCLAIR, in being promoted to vice president of *Crown Zellerbach Corp.*, relinquishes duties of assistant vice president, manufacturing department, and takes active charge of firm's industrial relations department. He succeeds vice president ALEXANDER

BLUE DIAMOND
INDUSTRIAL
RUBBER LINING

Pipe • Fittings • Valves
Tanks • Drums • Tumblers
Fans • Blowers • Ducts



Here's the economical way to make metal resistant to chemicals, abrasive materials, or contamination... Blue Diamond linings have proven themselves in hundreds of installations under severest conditions. Rubber lining assures longer life and lower maintenance costs for tanks, pipes, fittings, tumblers, blower housings, ducts, etc. Blue Diamond Rubber is a vulcanized product the components of which are crude rubber and other materials... cured by vulcanization at controlled temperatures. Linings are available in a range of hardnesses to meet your specific application. *Prices are right!*

Phone or Write for Literature and Complete Details

BLUE DIAMOND RUBBER & PLASTIC LINING

LATEX DIPPED PRODUCTS

4520 East Washington Blvd. • Los Angeles 22, California • Telephone ANgelus 3-1437

R. HERON, who will continue to carry out responsibilities for general coordination of industrial relations, public relations and employee benefits.

Rosan, Inc., Newport Beach manufacturer of screw threaded products, makes following appointments: BRIG. GEN. STANLEY E. RIDDERHOF, USMC (Ret.), becomes assistant to firm's president; and HARRY N. BAILEY, formerly Air Force regional representative, Los Angeles region, becomes vice president.

ROBERT L. GOODYEAR is appointed chief engineer of *Marquardt Aircraft Co.*, Van Nuys.

H. A. MCINTOSH is now in charge of product engineering department, *General Controls Co.*, Glendale. He was previously chief engineer at *Delron Co., Inc.'s* plant.

Friden Calculating Machine Co., Inc., San Leandro, makes following changes in its executive set-up: FRED URQUHART and A. F. ANDERSON are both named superintendents of Friden defense projects; NORMAN GREINER is named general foreman of calculating machine assembly departments; JOHN MARTINSON becomes chief inspector of calculating assembly division; HENRY REALE is appointed foreman in charge of departments 45 and 46; and A. SILVA is now assistant foreman of sub-assembly.

NIEL N. DAHL, chief engineer of *Harry F. Haldeman, Inc.*, is elected to office of vice president.

JOHN W. QUIMBY, secretary-treasurer of San Diego County Central Labor Council (A. F. of L.), is appointed executive director of First North American Conference on Apprenticeship, to be held in San Diego, Aug. 2 to 9.

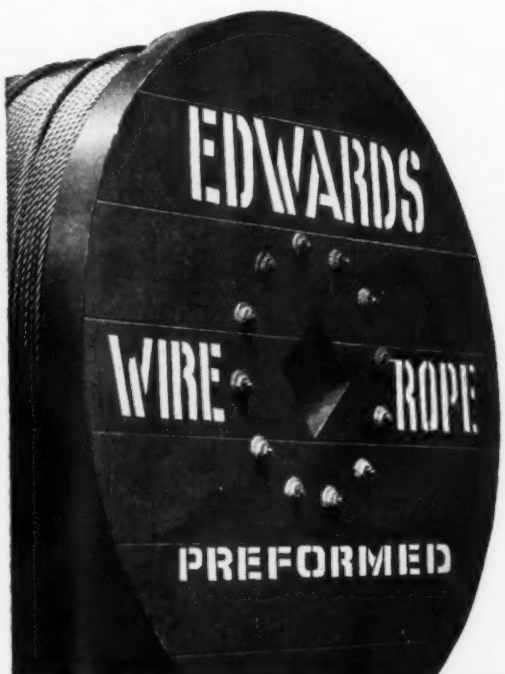
HOWARD D. NEAL, formerly general manager of *Aerol Co., Inc.*, Los Angeles, is promoted to office of vice president and general manager of his company.

EDWARD H. FARMER, former *Lockheed* works manager, is elected vice president—manufacturing of *Pacific Airmotive Corp.*, Burbank. VERLE J. FLIEGER is promoted from position of industrial relations assistant, Pacific Airmotive, Burbank, to that of industrial relations manager, PAC, Chino.

E. H. Farmer

G. M. Bryson

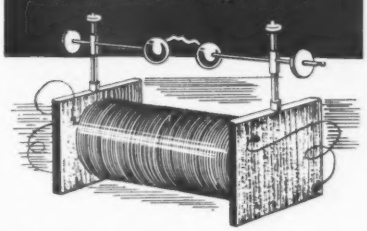
GEORGE M. BRYSON, formerly supervisor of piecework rating for *Bethlehem Pacific Coast Steel Corp.*, is newly-appointed chief industrial engineer for company's steel plant operations in Seattle, South San Francisco and Los Angeles, and its fabricating works in Seattle, Alameda, South San Francisco and Los Angeles.



Increase the efficiency of your MATERIALS HANDLING EQUIPMENT

Specify EDWARDS WIRE ROPE
E. H. EDWARDS COMPANY
General Office: South San Francisco, California
Los Angeles • Seattle • Portland • Houston

What cost Marconi 2 years?



He knew his wireless telegraph could dissolve communication miles to a fraction of a second—BUT he lacked the proper materials and supplies to expedite his theory into reality.

Don't waste your time with supply problems. The nation's finest industrial products are as near as your phone.

TRI-STATE OFFERS YOU... prompt delivery of brands you know—products of proven worth and dependability.

ONE CALL FOR ALL TOP BRANDS!

ANACONDA — ANACONDA WIRE AND CABLE CO. Magnet Wire & Other Copper Products
AEROVOX — AEROVOX CORP. Electrolytic & Oil Filled Capacitors
ARTOS ENGINEERING CO. Automatic Measuring & Cutting Machinery
Belden — BELDEN MANUFACTURING CO. Lead-In, Aircraft, Shunt Wire & Cords
BUNTING BRASS & BRONZE CO. Bronze Bearings & Bars
CONTINENTAL WIRE & CABLE CO. Asbestos Wire & Cable
COTTRELL PAPER COMPANY Electrical Insulating Paper
CROWN INDUSTRIAL PRODUCTS CO. Coil Winder Drives & Heads
Dolph's — JOHN C. DOLPH CO. Insulating Compounds, Varnishes & Sealers
DOW-CORNING CORPORATION Silicone Varnish & Silastic Compounds
E. I. du PONT de NEMOURS & CO. Insulating Varnishes, Sealers & Enamels
ELECTRO-TECHNICAL PRODUCTS DIV. Varnished Cloth, Tape & Combinations
ELIZABETH WEBBING MILLS Cotton Tapes & Sleeving
IDEAL INDUSTRIES, INC. Shop Equipment & Tools
MINNESOTA MINING & MFG. CO. Scotch Electrical Tapes
OHIO CARBON COMPANY Carbon Brushes & Carbon Products
OWENS-CORNING FIBERGLAS CORP. Fiberglas Tape, Sleeving & Cordage
POTTER & RAYFIELD, INC. Heavy Duty Coil Winding & Spreading Equipment
RESIN INDUSTRIES, INC. Plastic Electrical Tubing, Tape & Materials
SUFLEX CORPORATION Saturated Sleeving & Varnished Tubing
TAYLOR FIBRE CO. Vulcanized & Phenol Fibre Sheets, Rods & Tubes

TRI-STATE SUPPLY CORPORATIONS
LOS ANGELES 13 • 544 South San Pedro St. MUtual 2354
SAN FRANCISCO 7 • 354 Bryant Street EXbrook 2-8890
SEATTLE 4 • 318 Occidental Avenue Main 4161

GEORGE E. MARTIN, formerly manager of *Standard Oil Co. of California's* regional personnel office at Taft, is appointed manager, Los Angeles regional personnel office. He succeeds BARTON CATER, retired.

ADRIAN C. WEST, research engineer with *California Research Corp.*, a Standard Oil Co. of Calif. subsidiary, is named 1953 winner of Walter D. Hodson Junior Award of American Society of Lubricating Engineers. Recognition is for his paper "Friction and Boundary Lubrication," presented to ASLE Northern California section last year.

MARVIN G. WHITNEY is appointed assistant to president of *Hoffman Radio Corp.*, Los Angeles. His current assignment, on television engineering, quality control and product design, will be carried on from Plant No. 5, Los Angeles. JOHN STEVENS is named director of manufacturing and production head of all television activities in TV division. He comes to Hoffman from his own sales-manufacturing consulting business in Chicago.

Sunset Oil Co., Los Angeles, reports following shifts in personnel: MORTON A. STERLING, formerly vice president, becomes executive vice president; LEO PEARLSTON is elected a vice president; and H. G. MCKAY is elected assistant vice president.

WAYNE HARMON is named assistant chief engineer of *The Rucker Co.*, Oakland. C. J. NIVEN will manage Rucker branch office in Seattle, Wash.

R. B. CLEVERING, formerly eastern zone manager of *General Motor Corp.'s* Allison division, is elected president of *Harvill Corp.*, Los Angeles. He replaces E. F. GOULD, plant manager of *Anaconda Wire & Cable Co.*, who continues as a director of Harvill.

WILLIAM S. PETERSON becomes assistant general manager and chief engineer of Los Angeles water and power department. He is replaced as chief electrical engineer by IVAN L. BATEMAN.

LOUIS L. POTOMAC, formerly president of *Alsynite Co.*, San Diego, is elected president of *Reflin Co.*, Los Angeles manufacturer of reinforced plastic pipe.

L. L. Potomac

R. D. Hallock

ROBERT D. HALLOCK is advanced from position of chief engineer to that of plant manager of *Bardwell & McAlister, Inc.*, Burbank.

R. B. ROBINETTE is new president of *General Paint Corp.*, Los Angeles and San Francisco. He succeeds HENRY L. JONES, resigned. WILLSIE WOOD, previously a *Bank of America* officer, is elected vice president, and D. M. BEALE is elected treasurer.

H. R. LOBELL, packaging engineer, is elected by *Machinery Manufacturing Co., Inc.*, Los Angeles, as its vice president in charge of production and field service.

FRANK D. WALLACE is named chief engineer of *Magna Mill Products*, South Gate. Prior to joining Magna, he was a tool engineer at *Douglas Aircraft Co.'s* Long Beach division.

D. T. FISHER, formerly assistant to president of *Consolidated Vultee Aircraft Corp.*, San Diego, becomes corporation's controller. From position of controller, G. T. BOYEE moves to that of treasurer.

Colorado

C. A. MYHRE, previously executive vice president of *Frontier Airlines, Inc.*, Denver, is elected president.

JAMES A. TRAVIS is new president of *Eaton Metal Products Co.*, Denver. He succeeds his father, the late J. RAY TRAVIS, founder of this steel tank manufacturing concern.

H. H. HINSON, general manager of *Continental Oil Co.'s* Southwestern region, is elected vice president in charge of engineering.

Idaho

IRA C. JONES, formerly executive vice president of *Gem Canning Co.*, Emmett, succeeds the late ALBERT MOHLER in presidency of firm.

LAWRENCE A. JAMES steps up from assistant chief engineer to chief engineer at *Coeur d'Alene Hardware & Foundry Co.*, Coeur d'Alene, to fill vacancy left by H. G. COULSON's departure to become designing engineer for *Moffett Engineering Co.*, Albany, Calif.

Montana

A. LEO GALLAGHER, Helena, is appointed manager of *Elliston Lime Co.*, Elliston, Powell County. He formerly was supervising mining engineer for Helena office of *Reconstruction Finance Corp.* He succeeds HAROLD T. KUEHN, deceased.

Nevada

Pioche Manganese Co., Las Vegas, a subsidiary of *Combined Metals Reduction Co.*, Salt Lake City, Utah, adds following people to its staff: J. T. CRAWFORD, office manager; FRANK P. SOUDERS, plant superintendent; L. J. HARTZELL, chief chemist; and RAY E. KIRK, master mechanic. At Pioche's Castleton operation, E. R. BUTZE is named kiln superintendent, and JAMES F. ORR becomes plant superintendent.

Oregon

ORVILLE B. EUSTIS is new manager of *Oregon Fibre Products* plant at Pilot Rock. He was formerly production manager of *United States Gypsum Co.*

THOMAS D. TAYLOR is named president of *Freightliner Corp.*, Portland. He will continue to serve firm as general manager. RODNEY JEFFREY, controller, becomes secretary-treasurer.

ELWELL-PARKER

CATALOGS SALES SERVICE

POWER INDUSTRIAL TRUCKS

FORK LIFT TRUCKS

CRANES

IRA G. PERIN CO.

MATERIAL HANDLING EQUIPMENT

575 HOWARD ST., Dept. C
GArfield 1-1827
SAN FRANCISCO 5

EST. 1920

6829 RITA AVE., Dept. C
Jefferson 3213
HUNTINGTON PARK

Utah

A. E. TERRY is named assistant general superintendent, Geneva Works, Columbia-Geneva Steel division, *United States Steel Corp.* Prior to his new assignment, he was division superintendent, coke and by-products, at Geneva Works.

K. K. HOOD, formerly general manager of *Callahan Zinc-Lead Co.*, becomes chief engineer of *Combined Metals Reduction Co.* at Salt Lake City. He replaces M. J. KENNARD, recently promoted to managership of *Pioche Manganese Co.*, Las Vegas, Nev.

Washington

RAY L. MEDLER, formerly Washington, D. C., representative of *Kenworth Motor Truck Corp.*, is appointed assistant treasurer with headquarters at firm's Seattle plant.

E. F. FITZMAURICE is named *General Electric* manager of union relations at Hanford Works, Richland. He succeeds J. N. DUPUY, who becomes G. E. regional manager of union relations and will be transferred to New York.

Boeing Airplane Co. appoints following men in its pilotless aircraft program: RICHARD NELSON, production manager for program; R. E. BOTHELL, assistant to manufacturing manager; LEWIS DANIELS, process coordinator; REX DELAWARE, division superintendent responsible for factory shops; CLYDE PETERSON, tooling manager; and JOHN ALEXANDER, project engineer.

Long-Bell Lumber Co., Longview, reports following changes within ranks: retiring are J. H. KENNESSON, vice president and general manager of Longview division, and vice president and general manager of *Gardiner Lumber Co.*, a wholly-owned subsidiary, and R. F. MORSE, vice president in charge of timber and logging for both companies; THEO A. DEAL moves from position of Longview division's assistant general manager to that of general manager; A. J. MYERS follows same steps at Gardiner Lumber; A. J. SANDOZ, chief forester of Longview division, is named manager of Northwest timber department; and VERN C. HANSON becomes chief log buyer for Longview division.

Two Nor'Westers

EDWARD P. STAMM, Portland, logging manager for *Crown Zellerbach Corp.*, is promoted to position of vice president directly in charge of corporation's timber, logging and forestry operations in United States. He will retain headquarters in Portland.

E. P. Stamm

N. L. Krey

Kaiser Aluminum & Chemical Corp. appoints NORMAN L. KREY as manager of Northwest operations. He was formerly manager of reduction operations. His headquarters will be in Spokane. KENNETH KUHNS, previously engineering superintendent of Kaiser's Trentwood plant, transfers to concern's extrusion plant near Halethorpe, Maryland. His place will be filled by DAVID MAYERS, formerly production superintendent.

ASSOCIATIONS ELECT

National Association of Frozen Food Packers: President, M. K. SPIEGL of *Spiegl Farms, Inc.*, Salinas, Calif.

Purchasing Agents Association of Washington: President, M. C. MICHENERY of *Cragin & Co.*, Seattle; first vice president, DEAN SMITH of *Sumner Iron Works*, Everett; second vice president, GEORGE H. WILSON of *Atlas Foundry & Machine Co.*, Tacoma; treasurer, E. A. HURLEY of *Western Blower Co.*, Seattle; and secretary, F. F. SESSIONS of *Bethlehem Pacific Coast Steel Corp.*, Seattle.

Nevada Mining Association (formerly *Nevada Mine Operators Association):* President, ROY A. HARDY of *Getchell Mines, Inc.;* first vice president, JOHN C. KINNEAR, JR., of *Kennecott Copper Corp.;* and second vice president, PERCY G. DOBSON of *Summit King Mines Corp.*

Ornamental Metal Manufacturers' Association, Los Angeles: President, STANLEY ASHTON of *Alhambra Foundry Co.;* vice president, STEVEN VIDOS of *Washington Ornamental Iron Works;* secretary-treasurer, BILL MILLER of *Miller Iron Works;* and membership chairman, HEARD IZANT of *Cochran-Izant Co.*

West Coast Lumbermen's Association: President, G. E. KARLEN of Tacoma, general manager of *Eatonville Lumber Co.;* vice presidents, N. B. GIUSTINA, general manager of *Giustina Brothers Lumber Co.*, Eugene, Ore., and R. M. INGRAM, general manager of *E. C. Miller Cedar Lumber Co.*, Aberdeen.

American Society of Tool Engineers: Assistant secretary-treasurer, WAYNE EWING, partner, *Arrowsmith Tool & Die Co.*, Los Angeles.

American Society of Mechanical Engineers, Southern California section: Chairman, FRANK P. BAEYERTZ of *General Petroleum Corp.;* vice chairman, L. F. RICHARDSON of *Bailey Meter Co.;* secretary-treasurer, R. M. HATFIELD of *Combustion Engineering-Superheater, Inc.;* junior chairman, C. O. GILES of *Bechtel Corp.;* junior secretary, F. B. CLARK, JR., of *Weber Aircraft Corp.*

Western States Council: President, EARL REYNOLDS, manager, *Boise Chamber of Commerce;* first vice president, G. LEWIS FOX, manager, *San Francisco Chamber of Commerce;* second vice president, LORIN MARKHAM, manager, *Spokane Chamber of Commerce;* secretary, EARL MURPHY, manager, *Idaho State Chamber of Commerce.*

Western Food Processors Association: President, H. D. BUXTON, *California Frozen Foods, Inc.;* vice president, STERLING B. DOUGHTY, *Sacramento Frosted Foods;* treasurer, EDWARD S. HART, *Central California Berry Growers Association;* secretary and managing director, A. H. HARRISON.

YOU CAN PROFITABLY USE

YUBA's Manufacturing Facilities

Located in San Francisco Bay Area at Benicia

For contract manufacturing and for sub-contracting parts and assemblies, use YUBA and save time, expense, and personnel worries. Our varied plant facilities enable us to handle almost any metal product—light or heavy. We have skilled workers and a long-time reputation for stable labor relations, plus years of experience in contract manufacturing and fabricating for private industry and government.

Services Available to You Include—

- ✓ Carbon and alloy steel forging
- ✓ Heat treating
- ✓ Steel fabricating and welding
- ✓ Pattern shop
- ✓ Iron and bronze foundry
- ✓ Heavy and light machining
- ✓ Export packaging

These services are especially adaptable to manufacturers wishing to sub-contract defense orders.

HANDY SETUP... FACTORY AT BENICIA OFFICES IN S. F.

YUBA's plant is located at Benicia., Calif., handy to deep water, transcontinental railroad, truck and air shipping. General offices and engineering department are situated in San Francisco's financial district.

Send us your drawings and specifications for estimates. No obligation. Write, wire or telephone EXbrook 2-0274.

YUBA OREDGES APPROVED DEPENDABILITY

YUBA MANUFACTURING CO.

Room 701 • 351 California St. • San Francisco 4, Calif.

COULD YOU FURNISH
PROOF OF LOSS
IN CASE OF FIRE

PLANT ledgers and book records are usually entirely inadequate in establishing proof of loss in case of fire. Changing values and continual plant improvements are important reasons why you should consider a General Appraisal. Here in one compact volume is a factual record of all plant assets, showing replacement values, present values and insurable values. A recognized authority . . . a positive proof of loss.

GAC
GENERAL APPRAISAL COMPANY
SEATTLE LOS ANGELES
PORTLAND SALT LAKE CITY
SAN FRANCISCO VANCOUVER, B. C.

ZURBACH
STEEL CO. OF CALIF. INC.
ANGELUS
3-2101
P.O. BOX 6769, LOS ANGELES 22

Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

HOWARD L. PACK is appointed regional service sales manager for *White Motor Co.* Pacific Coast region. His headquarters will be in San Francisco.

H. L. Pack

K. B. Stuart

K. B. STUART is appointed general manager of coke and chemical sales for *The Colorado Fuel and Iron Corp.*, Denver.

Tweco Products Co. announces appointment of GLENN E. SMITH as West Coast representative with residence in San Jose, Calif.

P. KING FARRINGTON is now Pacific Coast sales manager of *United States Pipe & Foundry Co.*, San Francisco.

J. W. STALLINGS is named general manager of distribution of *Clary Multiplier Corp.* He is located at San Gabriel, Calif.

Reflin Co., Gardena, appoints *The Republic Supply Co. of Calif.* as distributor for Reflin pipe.

Pomona Tile Manufacturing Co. opens its southwest branch office in Phoenix. CLAUDE BURROWS is in charge of operations.

Homestrand, Inc., distributors of measuring tools and instruments, appoints *John G. Fitzpatrick Co.*, Seattle, as exclusive representative in Oregon and Washington.

JOHN R. HOWELL is appointed regional sales manager for *Sterling Electric Motors, Inc.*, at Los Angeles.

J. R. Howell

W. B. Wold

WALLACE B. WOLD is named stud welding specialist at *Western Oxygen, Inc.*, Seattle, distributors of Nelson stud welding equipment.

Coleman Engineering Co. of Los Angeles appoints *Beckman Instrument Co.* as national distributor for firm's new digitizer. Distribution will be made through Berkeley Scientific division, Richmond, Calif.

WILLIAM T. LISENBY, LARKIN L. BLAKE and THEODORE G. LYSTON are new salesmen recently added to *Minneapolis-Honeywell Regulator Company's* industrial division. Lisenby goes to Los Angeles, the other two are assigned to San Francisco.

W. DENNUS BARTON, formerly owner and manager of *Consolidated Plastics*, is named to executive sales staff of *Alsynite Co. of America*, San Diego, Calif.

ROBERT A. DAILY is named resident manager of a new Delco battery plant soon to be built for *General Motors Corp.*, at Anaheim, Calif.

Automatic Switch Co. is opening a factory branch on 923 East Third St., Los Angeles.

WILLIAM K. PETLY, formerly vice president of *Petly, Inc.*, is now in charge of Berger office equipment division at company's Oakland branch.

F. PELLETIER, Los Angeles, will service customers of *C & D Batteries, Inc. McCormick-Morgan Co.*, San Francisco, will handle sales and service activities in Northern California.

A. B. Boyd Co., San Francisco, is appointed a general distributor for *Armstrong Cork Co.* industrial division products.

Rapids-Standard Co., Inc. of California, San Francisco, is appointed West Coast representative for *The Raymond Corp.*

Rotex Punch Co. appoint the following new dealers for their line of bench mills: *Production Machinery Sales, Inc.*, Burbank; *Delta Equipment Agency*, Oakland; *Star Machinery Co.*, Seattle.

MILLER-ROBINSON CO.
HIGH FREQUENCY
INDUCTION PROCESSING

SILVER BRAZING
LOCALIZED HEAT TREATING

Production — Tooling
Engineering — Equipment

7007 Avalon Blvd., Los Angeles 3
PLeasant 2-6141

Bettcher Plastics Co., Portland, is appointed distributor for *Plexolite Sales Co.*

American Can Co. creates three new Northern California sales districts. They are San Francisco, San Jose and Oakland districts, under managers D. M. JOHNSON, H. L. SUTHERLAND, and B. C. PAULSEN respectively.

Trailmobile, Inc., opens a new branch in San Francisco. The new manager is WILLIAM A. BOYKIN.

Marwais Steel Co. having expanded facilities, is moving to a larger warehouse at 6466 Gayhardt St., Los Angeles.

REX MALONE is named California district representative for Oilwell Supply division of *U. S. Steel*, and FRED WILKINSON is made manager of Long Beach, Calif. store.

Los Angeles sales office of *Permuitit Co.* moves to a new location at 302-B South Brand Blvd., Glendale.

ROBERT STRONG, formerly consulting electronics engineer to *Allen B. Dumont Laboratories*, is appointed encapsulating division sales manager for *Calresin Corp.*, Arcadia, Calif.

ROBERT L. SIMMONDS is appointed sales supervisor in Seattle office of *Westinghouse Electric Corp.*

C. TRAVERS FOXWORTH will be resident sales representative in Spokane for *Bethlehem Pacific Coast Steel Corp.*

Westinghouse Electric Corp. establishes a San Francisco branch office under HAROLD G. RETHMEYER, manager.

The Electric Corp. of California of Los Angeles is appointed as a *Westinghouse Electric Corp.* agent-distributor.

SAMUEL P. FELIX is appointed general manager of San Francisco subsidiary of *De Laval Steam Turbine Co.*

VERGIL KOCH, salesman in Southern California, is moved to San Francisco where he will be manager of San Francisco operations of *Hubbard Co.* He replaces BOB COOK, resigned.

Allis-Chalmers Manufacturing Co. district and branch office territories of Denver, Salt Lake City, Phoenix, and Spokane, are being combined into a Rocky Mountain region

R. D. Moody

R. L. Engel

with headquarters at Denver. RICHARD D. MOODY is named manager. He is succeeded as manager of Los Angeles district office by RICHARD L. ENGEL.

HOWARD K. VAN SCHOICK and ROBERT E. STERRETT are appointed to service manufacturing accounts in Oregon and Washington and Arizona and Southern California respectively for *Caterpillar Tractor Co.*, San Leandro, Calif.

A new factory branch warehouse is being opened in San Francisco for *Fort Worth Steel & Machinery Co.* S. G. MARGRO, firm's Pacific Coast district manager, will be located in new office. J. G. TEMBLADOR will be in charge of Los Angeles warehouse.

S. G. Margro

G. R. Sommers

GEORGE R. SOMMERS, formerly with *Sylvania Electric Products, Inc.*, is appointed director of marketing for *Food Machinery & Chemical Corp.*, San Jose, Calif. SAMUEL A. MENACCI is promoted to assistant sales manager.

GEORGE N. VOLZ is appointed *Osgood-General* division sales manager for Oregon, Washington, Montana, Idaho, and Utah with offices in Portland.

Keenan Pipe & Supply Co. opens an office and warehouse at 214 South 14th St., Phoenix. ROBERT C. JENNINGS is manager of Keenan's new branch.

ROLAND O. CRAWFORD is new Rocky Mountain division sales manager for security engineering division, *Dresser Operations, Inc.*, with headquarters in Whittier, Calif.

Headquarters in Southern California for these and other

FAMOUS BRANDS

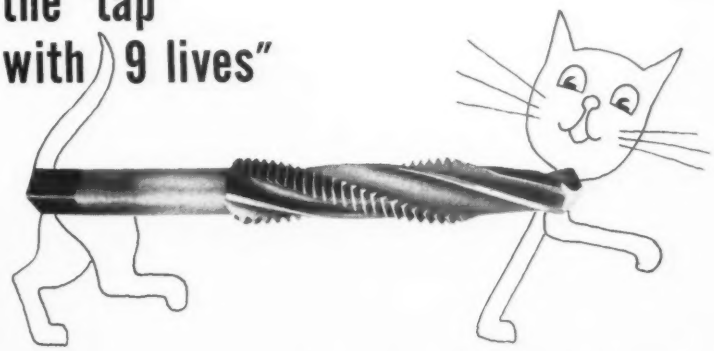
Lufkin Rule Co.
J. H. Williams & Co.
Chicago-Latrobe Drills
Carboloy Co.
Boston Gear Works
Fafnir Bearings, Inc.
Gates Rubber Co.
Yale & Towne Hoists
Schrillo Tools

FAST•RELIABLE•ACCURATE

Call: Kimball 7221

GARRETT
SUPPLY COMPANY
A DIVISION OF
THE GARRETT CORPORATION
3844 Santa Fe Ave., Los Angeles, Calif.

the "tap with 9 lives"



"The usual run of taps on thin walled work, .098 over tap O.D., was from 5 to 500 pieces. First Electrolized tap ran 4,360 pieces—taken out because it chipped one tooth in chamfer—second tap is well on its way to a better run than first, "says a user of Electrolized taps. Save hours and money in down and set-up time—buy Electrolized tools from us, or we will Electrolize your sharpened tools for you at a nominal cost. Learn more about the "tap with nine lives" and Electrolizing. Phone or write to

PR. 7876
1406 E. 15th STREET
LOS ANGELES 21, CALIF.

ELECTROLIZING SALES *and* TOOLS, *Inc.*

HOT
OFF THE PRESS
and

1953 Edition

Mall

PNEUMATIC
TOOL CATALOG

Yours free—the new, info-packed MALL catalog showing the very latest pneumatic tools available. It's a MUST for your reference file. Send for it today and get all the facts about the world-famous MALL line of completely modern pneumatic production tools . . . a size and style for every need.

Get Your
FREE COPY NOW!

MU-23

MALL TOOL COMPANY
7810 S. Chicago Ave. Chicago 19, Ill.

RUSH me a free copy of the 1953 MALL Pneumatic Tool catalog.

*Name*_____

*Firm*_____

*Address*_____

PREVENTIVE MAINTENANCE for your personnel

SOUTHERN California industry, through the Merchants and Manufacturers Association of Los Angeles, has been attacking the management reorientation problem for many years.

In the factory, wage administration is being worked over from the viewpoint that wages, besides being the basic reason for an employee's coming to work, represent the prime index of the individual's status and security within the plant. The M & M is studying the best current systems, evaluating them and distributing the results through bulletins and meetings.

Management is setting up effective two-way communications programs to tell workers of management motives and to inform management of ground-level inefficiencies and dissatisfactions.

Preventive maintenance in personnel is being applied to the problem of poor morale and its consequent high turnover, absenteeism, and low productivity. Experience in this field is exchanged in meetings and through survey reports.

The policy of promotion from within is becoming widely accepted, as is training and raising employees to their highest effective levels. Teaching of basic economics to supervisors and then to other employees is advocated.

Southern California businessmen are also earnestly working outside their plants on this reorientation problem. Part of this job is bringing business and its workings out in the light so that the public can see that it isn't necessarily evil.

The most important out-of-plant work takes place through close cooperation which has grown up between schools and Los Angeles industry. One phase points out to vocational guidance people that many students taking academic courses in high school will never get to college, and should be prepared vocationally and emotionally to earn their livings in satisfying and productive ways.

This plan should shorten the "shock period" in which many recent high school graduates wander aimlessly from job to job with no idea of what they want to do. In later life these people often become frustrated with their jobs, and are potential enemies of business. It is believed that the shock period can be eliminated by careful preparation in a chosen skill while still in high school.

A unique summer workshop program is being conducted in which vocational guidance counsellors, high school and grammar school teachers spend four weeks studying beginner's job possibilities and actually working at these jobs. The purpose is giving them solid experience on which to base realistic advice to their students. A similar program for junior college instructors is also conducted during the school year.

SUBCONTRACTING metal workers organize

METALWORKING Subcontractors Association has been formed as a nonprofit organization, with headquarters at 9900 Washington Blvd., Culver City, Calif., to provide its members with service in their contact with government agencies along lines where the individual subcontractor cannot devote the required time, effort and expense to acquire recognition and results.

Committee chairmen are: James C. Thomas, Utility Metal Products, Inc.; Frank E. Hooykaas, National Tapered Wings, Inc.; Doyle F. Lindley, The Parent Company; S. S. Hershey, California Duplicating Company, Inc. J. H. "Sparky" Stevenson is business consultant for the association.

Provides the last word in property control . . .

● American retrospective appraisals establish unit property records with individual costs, depreciation reserves and provisions—

Kept up to date, they are the last word in property control.

The AMERICAN APPRAISAL *Company*

Over Fifty Years of Service

OFFICES IN PRINCIPAL CITIES

CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are ⅛ inch short of contracted space to allow for borders and composition. Rates are $7.50 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.

COST REDUCTION WITH RESULTS Guaranteed

- labor costs
- indirect labor
- office & clerical
- material costs
- overhead costs

ALFRED I. STUART and ASSOCIATES, Inc.
Consultants on Management
720 AMERICAN BANK BLDG. • PORTLAND 5, OREGON

Pipe Repair CLAMPS

Made for every type of leak—any temperature or pressure. Send for Catalog No. 41-O.

M. B. SKINNER CO., SOUTH BEND 21, INDIANA

POWER SHORTAGE?

We offer for sale, in excellent condition and used very little—Two (2)—G.M. 200 KW Diesel Power Units, model #8-268A, each equipped with D.E. switchboard. Write or wire

FIREBAUGH CANAL COMPANY
Los Banos, California

FOR RENT OR LEASE

WATSONVILLE WAREHOUSE

Available for lease until Nov. 1958 with option to renew. One story cement building having 20,000 sq. ft. of area free of pillars. Floating floor, steel reinforced roof has ventilators plus skylights. Large doors on both sides open to loading docks served by trucks and S. P. spur. 1,000 sq. ft. office space in one end. 16,000 sq. ft. yard, macadam surfaced and steel fenced.

Contact
J. C. HUNTER
309 HILL AVE., WATSONVILLE, CALIFORNIA
P. O. BOX 749
Phone: 4-6321 or 4-4648

FOR SALE 2 CLIMAX ENGINES

245 HP at 1200 RPM—Model R8I.
Complete with radiator and clutch.
Butane operated.
Also 3000 gal. butane tank.

Write, wire or phone

JAMES B. ALLEN
P. O. BOX 212, SAN CARLOS, CALIF.
Phone Lytell 3-0413 or Lytell 3-2889

ANODIZING FACILITIES

Full finishing service for aluminum products. Clear Anodize; R-5 Bright Dip; Color Anodizing; Government Specifications; Frankford Arsenal Spec. No. FXS-963 Type II Class 1, 2, & 3.

ALSO DICHOMATE SEALING:

Prompt Service from
W. F. HEINE SUPPLY CO.
6015 Adeline St. Oakland 8, Calif.
OLympic 3-5500

100 GENUINE 8 x 10 PHOTOS 10¢ ea

24 HOUR SERVICE!
FREE DELIVERY ANYWHERE
MADE DIRECT FROM PHOTOS (OR NEGATIVES) • 50 8 x 10 13c ea. 500 8 x 10 8c ea.

1000 8 x 10 GLOSSIES 7¢ EACH

POSTCARDS 5000 $21 PER M. 2½¢ each in 1000 lots

SAVE THROUGH QUANTITY PRODUCTION
FOR COMPLETE PRICE INFORMATION WRITE OR PHONE:
GRanite 6179
QUANTITY PHOTOS, Inc.
5509 SUNSET BLVD., HOLLYWOOD 28, CALIF.
LARGEST PHOTO REPRODUCTION PLANT IN WEST

FOR SALE

1—Ajax 11½ x 8 vertical steam engine. Excellent condition. $3500.00 with spare parts.

Can be seen at

WESTERN VENEER CO.
LEBANON, OREGON

LOW BED TRAILERS

12 Wheels
9 Units to Choose From

HALF TRACKS

2 with less than 1,000 miles.

5 — DODGE NAVY AMBULANCES

WRITE PHONE

Ben W. Colburn Co.
520 So. K St. Ph. 6-6533
TULARE, CALIF.

TOOLS and EQUIPMENT

6 ga. 8 ft. sheet metal brake	$395
3 hp. Delta Metal cutoff saw	$290
10 hp. Clayton steam generators	$400
2 Motorized Rotary beading Machines, each	$ 75

SIMPLEX MFG. CO.
1135 3rd Street OAKLAND. Calif. TW 3-0556

"We have had NUMEROUS REPLIES to our ad. Thank you very kindly."

So writes one satisfied user of *Western Industry* classified ads (name on request).

YOU TOO can benefit by the high readership, fast response offered here.

See rates at top of page.

SEND IN YOUR COPY TODAY!

INDEX TO ADVERTISERS IN THIS ISSUE

A

Acme Steel Company ... 18
Advance Gear & Machine Corp. ... 88
Aeroquip Corporation ... 97
American Appraisal Company, The ... 122
American Flexible Coupling Company ... 21
American Forge Co. ... 94
Anaconda Wire & Cable Company ... 50
Atlas Chain & Manufacturing Co. ... 13

B

Baron Industries ... 105
Bellows Co., The ... 52
Bethlehem Pacific Coast Steel Corporation ... 75
Blackman, Horace, Company ... 114
Brainard Steel Company ... 24
Buda Company, The ... 47

C

California Bank, Los Angeles ... 26
California Barrel Company, Ltd. ... Cover 2
Calstrip Steel Corporation ... 115
C. B. S. Steel & Forge ... 102
Chase Brass & Copper, Subsidiary Kennecott Copper Corporation ... 55
Chisholm-Moore Hoist Corporation ... 80
Clark Equipment Company ... 72
Cleveland Chain & Mfg. Co., The ... 6
Cleveland Crane & Engineering Co., The ... 79
Cold Metal Products of California, The ... Cover 3
Coldwell, Banker & Company ... 126
Colorado Fuel & Iron Corporation, The (Wickwire Spencer Steel Div., The California Wire Cloth Corporation) ... 113
Columbia-Geneva Steel Division, United States Steel Corporation ... 10 & 59
Connor Spring Manufacturing Co. ... 108
Cooper Alloy Foundry Co. ... 29
Crane Co. ... 16

D

Denver Fire Clay Company, The ... 12
DoAll Company, The ... 11
Durabla Manufacturing Company ... 111

E

Eastman Tag & Label Co. ... 106
Ederer Engineering Company ... 63
Edwards, E. H., Company ... 117
Electrolift, Inc. ... 107
Electrolizing Sales & Tools, Inc. ... 121
Evis Manufacturing Company ... 90

F

Faultless Caster Corporation ... 58
Fernholtz Machinery Co. ... 101
Flexible Steel Lacing Company ... 111
Fruehauf Trailer Company ... 77

G

Galland-Henning Mfg. Co. ... 22
Garrett Supply Co. (Div. of Garrett Corp.) ... 121
General Appraisal Company ... 120
General Electric Co. ... 15
General Petroleum Corporation ... 25
Goodall Rubber Co. ... 86
Goodrich, B. F., Co., The ... 3

H

Harnischfeger Corporation ... 73
Hassall, John, Inc. ... 109
Haynes Stellite Company, Division Union Carbide and Carbon Corporation ... 7
Herco Co. ... 114
Horn, A. C., Company, Inc. ... 19

I

Industrial Wire Products Corporation ... 106

J

Johnson Steel and Wire Company, Inc. ... 70
Johnston, A. P., Co. ... 124
Jorgensen, Earle M., Co. ... 85

K

Kaiser Aluminum & Chemical Sales, Inc. ... 69

L

Latex Dipped Products ... 116
Ledeen Manufacturing Co. ... 94
Lincoln Engineering Co. of California ... 60
Link-Belt Company ... 109
Lovejoy Flexible Coupling Co. ... 112

M

Magline, Inc. ... 110
Mall Tool Company ... 122
Masonite Corporation ... 27
Master Electric Company, The ... 81
Master Fan Corp. ... 78
Meriam Instrument Co., The ... 103
Miller-Robinson Company ... 120
Miniature Precision Bearings, Inc. ... 65
Moto-Truc Co., The ... 30

N

National Supply Company, The ... 57
National Welding Equipment Co. ... 23
Norgren, C. A., Co. ... 74

O

Oakite Products, Inc. ... 108
Ohio Hoist & Mfg. Co. ... 6
Osborn Manufacturing Company, The ... 66

P

Pacific Scientific Co. ... 5
Pacific Telephone and Telegraph Company ... 130
Panama Lamp & Commercial Co., Inc. ... 128
Perin, Ira G., Co. ... 118
Petley Incorporated ... 112
Printed Cellophane Tape Company ... 95

R

R & K Industrial Products Co. ... 96
Rangers Die Casting Co. ... 110
Reliance Steel Company ... 14
Republic Supply Company of California ... 53
Revere Copper and Brass, Incorporated ... 44 & 45
Richards-Wilcox Mfg. Company ... 71
Ridge Tool Company ... 92
Round California Chain Co. ... 6
Round Chain & Mfg. Co., The ... 6
Round Chain Companies ... 6
Round Los Angeles Chain Corp. ... 6
Round Seattle Chain Corp. ... 6
Rucker Co., The ... 54
Ryerson, Joseph T., & Son, Inc. ... 32

S

Scientific Lubricants Company ... 105
Skil Corporation ... 17
Smoot-Holman Company ... 105
Snap-On Tools Corporation ... 28
Soulé Steel Co. ... 127
Standard Oil Company of California ... 12
Stephens-Adamson Mfg. Co. ... Cover 4
Sturdi-Bilt Steel Products, Inc. ... 107
Surety Rubber Co., The ... 113

T

Thermoid-Western Co. ... 13
Towmotor Corporation ... 91
Tri-State Supply Corporation ... 117
Triangle Steel & Supply Co. ... 89

U

Union Pacific Railroad ... 131
U. S. Electrical Motors, Inc. ... 111
United States Steel Corporation ... 10, 59 & 129
United States Steel Supply Division, United States Steel Corporation ... 129

V

Victor Equipment Co. ... 104
Vulcan Foundry Company ... 93

W

Watson-Stillman Fittings Division, H. K. Porter Company, Inc. ... 49
White Motor Company ... 31

Y

Yuba Manufacturing Co. ... 119

Z

Zurbach Steel Co. of Calif., Inc. ... 120

Johnston Stainless Welding Rods

Practical, Down-to-Earth Welding Rods Alloys as they are supposed to be

Corrosion Resistant— Clean metal

Strong— Low in cracking

A. P. JOHNSTON CO. 1845 E. 57th St., Los Angeles

THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

ADDITIONAL EVIDENCE of the stability of the West's industrial economy is given in the charts and tables on this page, which are based on statistics appearing in the 1951 Survey of Manufactures by the U. S. Census Bureau, released in March.

The West's manufacturing employment has increased 28% since 1947, while the rest of the country actually had less people so employed in 1951 than back in 1947. The loss suffered by the rest of the country was three times as great as the West's gain.

The answer seems to be that the West has an expanding economy, with a rapid but steady influx of new population resulting in a continual broadening of the industrial base.

Further recognition of the West's increasing importance in the national picture came last month, when no less a person than the president of the National Association of Manufacturers, Charles R. Sligh, Jr., made his forecast of what may be expected in the future.

He predicted a total labor force in the West of 10,733,613 by 1960, an increase of 2,733,613 jobs, which is about in line with other forecasts.

WESTERN MANUFACTURING EMPLOYMENT SHOWS STEADY UPCLIMB FROM 1947 ONWARD

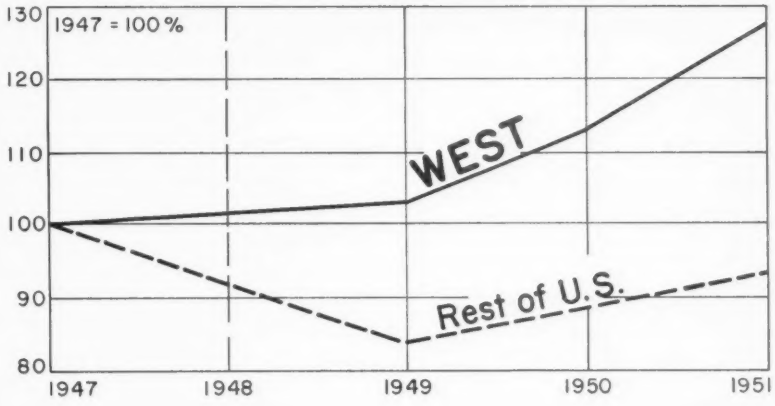


CHART at top of page shows how the West escaped a postwar dip in manufacturing employment suffered by the rest of the country. Taking 1947 as base (actual employment figures are shown in the tables at the bottom of the page), the West maintained a steady upward trend.

The chart below tells another significant tale, that the proportion of the total population employed in manufacturing establishments in the West has been steadily growing, while in the rest of the country it has declined in the postwar period.

PERCENTAGE OF NATIONAL MANUFACTURING EMPLOYMENT

	1947	1949	1950	1951
Pacific	5.6	6.8	7.0	7.5
Mountain	.9	1.0	1.1	1.1
TOTAL WEST	6.5	7.8	8.1	8.6
TOTAL, REST OF U. S.	93.5	92.2	91.9	91.4

ANOTHER SIGNIFICANT COMPARISON BELOW

MANUFACTURING EMPLOYMENT IN THE WEST

Manufacturing Employment rose from.....

58 people per thousand population in 1947 to...

66 people per thousand population in 1951.

IN THE REST OF THE U. S.

Manufacturing Employment dropped from.....

122 people per thousand population in 1947 to..

107 people per thousand population in 1951.

KEY

Each symbol represents 10 people in manufacturing employment.

MANUFACTURING EMPLOYMENT ESTIMATES

(By U. S. Census Bureau)

In thousands

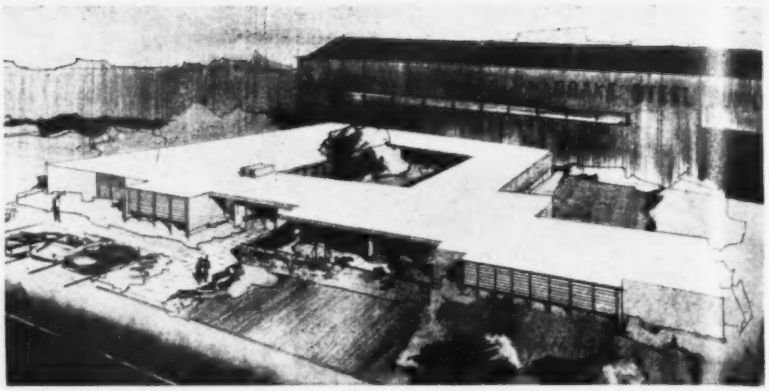
	1947	1949	1950	1951	Increase, 1947-1951 Amount	Per Cent
Pacific	913.7	941.7	1,037.1	1,179.4	265.6	29
Mountain	141.6	144.8	157.1	167.1	25.5	18
TOTAL WEST	1,055.4	1,086.6	1,194.3	1,346.5	291.1	28
TOTAL, REST OF U. S.	15,238.8	12,793.3	13,575.6	14,266.0	972.8	—6

ALASKA

WOOD PULP OPERATIONS—Alaska Juneau Gold Mining Company is considering use of its Juneau properties for a venture in wood-pulp manufacturing, according to its annual report. Alaska Juneau would hold a substantial minority interest in the pulp company formed for this purpose and, further, would be supplied with electric power permitting resumption of its own gold mining operations in the area. Company's Alaska operations were shut down in 1944.

ARIZONA

GARMENT MANUFACTURER PICKS MESA—New Western division of lingerie manufacturing company, Charles Komar and Sons, South Amboy, N. J., locates in Mesa and begins construction of 40,000 sq. ft. plant. Komar of Arizona, a separate company, will operate the plant, employing about 125 people at the outset and probably twice that number in full swing. Construction by Andrew P. Tell Co., Phoenix, will be completed around August 1.



NEW PLANT—Drake Steel Supply Co. will begin construction of a new office and warehouse for their Los Angeles headquarters July 1, to be completed around January 1. Cost of land, improvements and equipment will be about $750,000. Kenneth S. Wing of Long Beach is the architect. Structural design is by Grady & Jost, Engineers. The 15,000 sq. ft. office is an air-conditioned single-story building with patio. Glass areas will be shielded from sun by adjustable overhanging louvres. The 130,000 sq. ft. warehouse of steel construction will have three bays, each 500 feet long, with two 5-ton and one 10-ton cranes, one for each bay. Site is 8 acres in size, on the Los Angeles Junction railway.

President of the firm Albert H. Weinert announces sale of present 3¼ acre site to the Earle M. Jorgensen Co. Present buildings will be sold or moved.

Drake Supply Company, founded in 1934, is a distributor of general steel products, with warehouses also in Fresno and San Diego.

CALIFORNIA

CINEMA ENGINEERING PURCHASED BY EASTERN FIRM—Cinema Engineering Co. of Burbank, manufacturer of movie equipment, resistors, amplifiers and other electronic items, becomes a division of Aerovox Corporation, New Bedford, Mass. A. C. Davis, founder of the firm, continues as division manager and James L. Fouch as general manager. Cinema Engineering is building a 20,000 sq. ft. plant at 1100 Chestnut St., employs 200 people.

NORTHROP - ANAHEIM AWARDED ORDNANCE CONTRACTS—Contracts for production of telescopes and periscopes used in sighting and aiming 105-mm. self-propelled howitzers are awarded by the U. S. Army Ordnance Corps to Northrop Aircraft's Anaheim Division.

NEW PLASTIC COATINGS FIRM—William C. Lockwood founds Lockwood Resins Co., Pasadena, to produce plastic base coating for plywood forms used in concrete construction. Company anticipates expanding later to production of sealers and coatings for food processing and other industries.

HOLLINGSHEAD TO BUILD WEST COAST PLANT—R. M. Hollingshead Corporation, Camden, N. J., buys 10-acre tract in Sunnyvale and will begin construction of a $750,000 plant to supply the eleven Western States. The multi-story plant, with separate structures for offices, warehousing, and shipping, is scheduled for completion in early 1954. Hollingshead Corporation produces plastic "mothballing" film, hydraulic fluid used in fighter aircraft, and cleaners and maintenance aids for automobiles, household, and industry.

CALRESIN EXPANSION—Calresin Corporation, Arcadia, producer of hot melt materials, acquires Poly-Fiber, Inc., of Los Angeles, a subsidiary of Dumont.

NEW PRODUCT ADDED BY CURRIER COMPANY—Currier Company of Oakland will soon begin production of "Dee Tee" equipment for vapor degreasing automobile differentials and transmissions. Purchase of business from Vokar Corporation of Dexter, Mich., was announced by Farnsworth Currier, president.

PACESETTING ENGINE REPAIR PLANT—Cummins Service & Sales, Los Angeles, begins construction of new Bakersfield plant, to be completed by July. On an 8-acre site, plant will have a 16,000 sq. ft. working area.

PLANT INVESTMENT ACCELERATES IN 1953—New plants and expansions in San Francisco reported by the Chamber of Commerce for the two-month period of January and February 1953 total $5,957,000—more than eight times the total for the same period last year, $675,300. In the Bay Region as a whole, plant investments total $128,219,600, as against $4,942,455 last year.

CALIFORNIA PLANT FOR NATIONAL ALUMINATE—Construction begins this month on a new catalyst plant in South Gate for National Aluminate Corporation, Chicago. Several million dollar plant will produce microspheroidal grades of petroleum cracking catalyst to supply refiners in Western States. Completion is scheduled for late fall, full-scale production by the end of the year. National Aluminate Corporation also manufactures chemicals for water treatment, fuel oil treatment, paper processing and weed control.

BUILDING BOOM IN LOS ANGELES COUNTY—Building permit valuations for March in Los Angeles County are greatest in local history. Total of $133,242,173 is "considerably greater than the total building activity recorded all of last year in Houston, Dallas, or Philadelphia," says Milton J. Brock of L. A. Chamber of Commerce. Building permits for the first three months total $288,267,235, an increase of more than $90,000,000 over the same period last year.

MILLION DOLLAR ORDER—Hall-Scott Motor Division of ACF-Brill Motors Company, Berkeley, receives an order from Army Ordnance for 225 of its

INDUSTRIAL PROPERTIES

Warehouses - Buildings - Lofts - Plants - Factory Sites — Appraisals

SALES • LEASES

COMPLETE COVERAGE

Up-to-the-Minute Lists

COLDWELL, BANKER & COMPANY **REALTORS**

57 Sutter Street, SAN FRANCISCO 4, Phone SUtter 1-5420
425 - 15th Street, OAKLAND 12, Phone GLencourt 1-7300
900 Wilshire Blvd., LOS ANGELES 17, Phone MAdison 6-0611
1009 Jay Street, SACRAMENTO 14, Phone HUdson 1-1407
3018 Central Avenue, PHOENIX, ARIZONA, Phone 6-8445

engines amounting to over $1,100,000. The 295 hp. model ordered weighs about 2200 pounds and is used in the Army's tank retrievers. Hall-Scott is also manufacturing helicopter transmissions and ammunition.

STANDARD OIL AWARDS CONTRACTS — Standard Oil of California awards following contracts for the catalytic cracking project and para xylene plant to be built at its El Segundo Refinery: To Fluor Corp. of Los Angeles—construction of a 40,000 barrel per day cat-cracking plant; an addition to the alkylation plant and alterations to the naphtha rerun stills; construction of the para xylene plant. To M. W. Kellogg Co. of New York—construction of a 52,000 barrel per day residium stripper for the cat-cracking project. To Macco Corp. of Paramount—installation of off-site facilities. Fluor Corp. will begin field construction in September. All work is scheduled to be completed in August, 1954.

DEFENSE CONTRACTS FOR ROHR—Backlog of Rohr Aircraft Corp., passes the $200,000,000 mark with award of new contracts totaling $26,000,000 to build jet power packages and other components for Boeing. Plant and office personnel will reach 11,000 by early 1954, with over 8,000 at Chula Vista and about 2,800 at Riverside. The World War II peak of 9,800 employees will probably be reached in July or August. When construction of new Riverside factory is completed this year, company will have a combined total of over 1,100,000 sq. ft. of factory and office space in both locations.

LOCKHEED LEADERSHIP FUND—Lockheed Aircraft Corp. establishes scholarship program. Science and engineering scholarships will be offered at Cal Tech, Carnegie Tech, Cornell, Georgia Tech, M.I.T., North Carolina State, Purdue, Rensselaer Polytech, Stanford and Michigan. Scholarships in non-engineering courses applicable to the aircraft industry, such as business administration and industrial relations, will be offered at Emory, Harvard, Northwestern, Pomona, and Southern California.

BRAZILIAN AIRLINE ORDERS CONVAIRS—Brazilian airline, Real Transportes Aereos, contracts to buy four Convair-Liner 340's from Consolidated Vultee Aircraft Corp., San Diego. Current production plans at Consolidated Vultee call for the manufacture of 239 planes, of which 180 are Convair-Liner 340's.

CANNING EXPANSION—Filice & Perrelli Canning Co. of Richmond purchaaes canning and quick-freezing plant of Bear Creek Co. in Merced. Company will make some use of the large-scale quick-freezing facilities this year, its first venture in the field. Canning packs at Merced for 1953 will be limited to figs and peaches. Installation of new equipment will allow production in 1954 of same lines and about the same volume as the Richmond plant of F & P. Bear Creek property includes in addition to the plant 800 acres of Kadota figs, 80 acres of peaches and several hundred acres of bare land holdings.

SALE OF PALMER ELECTRIC—G. L. Ohrstrom & Associates acquire all assets of Palmer Electric Manufacturing Co. of Los Angeles, manufacturer of motor generating equipment. Harrison E. Palmer continues as general manager and executive vice president.

NEW YORK FIRM PURCHASES ELECTRO-TECHNIC CORP.—Telautograph Corp. of New York, manufacturer of office and plant communications systems, acquires Electro-Technic Corp. of Azusa, electronics research and manufacturing firm. The 30,000 sq. ft. plant employing 250 will be operated as a wholly-owned subsidiary of Telautograph.

SOUTHERN PACIFIC BUYS PROPERTY—Southern Pacific earmarks $800,000 for purchase of about 500 acres of land along its main line west of Fontana and the construction of additional track and yard facilities in the area. SP's plans for development of the property are to direct its use into the expansion of carload shipping industries requiring track service.

PLANT MOVES—Federal Electric Products Co. of New Jersey moves its Los Angeles plant, manufacturing switchboards and other electrical control equipment, into a new 45,000 sq. ft. building. The $400,000 plant, which is being leased, more than doubles production capacity, and the firm plans to increase its employees from 70 to 150 persons within six months. Adjoining the 66,000 sq. ft. site, a 70,000 sq. ft. tract is under option.

JET TEST CENTER — Lockheed Aircraft Corp. awards contracts totaling

the MODERN WAY TO BUILD
...a single building or an entire factory!
Slash BUILDING COSTS
EXTRA STRONG STEEL FRAME
SAVE TIME ON ERECTION
Best for ALL INDUSTRIAL COMMERCIAL & AGRICULTURAL CONSTRUCTION
ALL-BOLTED DESIGN PROVIDES FOR EASY ADDITIONS
QUICK DELIVERY OF ENTIRE BUILDING TO YOUR SITE
Phone or Write for catalog. Quotations furnished without obligation.
Soulé STEEL BUILDINGS
Plus FAST, SKILLED SOULÉ ERECTION
Mfd. by SOULÉ STEEL CO.
SAN FRANCISCO 1750 Army Street VAlencia 4-4141
LOS ANGELES 6200 Wilmington Ave. LAfayette 0911
PORTLAND 2630 NW St. Helens Rd. BEacon 5154
SEATTLE 3010 First Avenue SEneca 3008
FABRICATORS OF STEEL BUILDING PRODUCTS SINCE 1911

about $3,200,000 for construction of three buildings at U. S. Air Force jet test center at Palmdale to co-bidding Los Angeles firms, Manderbach Construction Co. and L. E. Dixon Co. Buildings, of steel and concrete construction, are to be a final assembly building, a production flight hangar, and a maintenance and service building, all to be completed in about ten months.

DETROIT FIRM PLANS PURCHASE—U. S. Radiator Corp. of Detroit seeks approval of California Commissioner of Corporations to proposed exchange of shares with Drayer-Hanson, Inc., of Los Angeles, in order to obtain 80% or more of that company's common stock. Drayer-Hanson, manufacturer of air conditioners, would continue as a subsidiary with no change in personnel.

PETRI WINE BUYS ITALIAN SWISS COLONY—In a $16,000,000 transaction, the Italian Swiss Colony wineries at Fresno, Lodi and Asti and bottling plants in Chicago and New Jersey move from ownership by National Distillers Products Corp. to the Petri Wine Company of San Francisco.

CAL PACK BUYS CAN MAKING EQUIPMENT—California Packing Corp. installs machinery at an Oakland plant to manufacture cans for some of its own plants.

ARMOUR LEASES POULTRY PROCESSING PLANT—Armour & Co. of Chicago lease plant of Morgan Hill Processors, Inc. for processing chickens and turkeys. New plant, to begin operation as soon as construction and equipment installation is complete around July 1, will serve Northern California area, now supplied by Armour's Turlock plant.

EASTERN FIRM TO BUY PACIFIC ELECTRIC—Federal Electric Products Co. of Newark, N. J., obtains an option to buy 98% of the stock of Pacific Electric Manufacturing Corp., San Francisco. Shares to be acquired come to a total of about $4,500,000. Pacific Electric, founded in 1906 by Joseph S. Thompson, who will continue in charge of operations, manufactures high voltage switchgear at plants in San Francisco and Santa Clara and has a light assembly plant in Gary, Indiana.

RAINIER BREWING CO. STUDIES PLANT OPERATIONS — Stockholders of Rainier Brewing Co. authorize a survey by outside engineers to determine the cost of modernizing its San Francisco plant and re-opening the Vernon plant and to recommend savings in operating expenses.

CERTIFICATES OF NECESSITY—Defense Production Administration issues certificates of necessity for the following defense-connected industrial projects: Southern California Edison Co., Bell, $2,926,788 for electric power; Hughes Tool Co., Culver City, $898,446 for electronic equipment; Del Norte Gin Co., Blythe, $229,249 for cotton ginning facilities; Tidewater Terminals Co., Inc., Pinole, $3,318,200 for petroleum storage; Stauffer Chemical Co., Compton, $510,000 for sulphuric acid; Lockheed Air Terminal, Inc., Burbank, $61,066 for airport facilities; Western Air Lines, Los Angeles, $250,000 for airport facilities; Shell Oil Co., Monterey, $1[illegible],000 for gasoline storage; Loven Chemical Co. of California, Newhall, $900,000 for formaldehyde; Cooper Precision Products, Los Angeles, $112,114 for aircraft parts; Southern Pacific Railroad, San Francisco, $53,685 for railway transportation; Southern Pacific Railroad, Firestone Park, Los Angeles, $112,547 for railway transportation; Shell Oil Co., Avila, $121,000 for petroleum storage; Gilfillan Bros., Los Angeles, $500,000 and $250,000 for electronic parts; Mearl Corp., Monterey, $477,500 for fire foam solution; Pacific Gas & Electric Co., San Mateo-Moraga, $2,463,660 for power line; Pacific Gas & Electric Co. Helm, $454,100 for natural gas line; Oil Terminals Co., Alviso, $84,000 for oil storage.

PRODUCTION STARTS AT NEW PLANT — Yosemite Creek Co. begins quick-freezing operations with strawberry crop at new Modesto site, formerly occupied by Can-Rate Products. Company, formerly located in Merced, will also enter juice and concentrate packing field.

SWEDLOW PLASTICS ACQUIRES SIERRA—Swedlow Plastics Co., producers of plastic glazing materials for aircraft, acquires Sierra Products Co. of Los Angeles, manufacturer of polyester materials.

NEW PLANT TREATS PEAR WASTE—Barnard Processing Corp., San Jose, is formed for commercial production of

7500 HOURS is a LONG TIME!

CHAMPION FLUORESCENT LAMPS
have guaranteed average rated life of
7500 HOURS
(3-hr. or longer burning cycles)

7500 hours means 40 hours a week for over 3 years and 7 months!

With CHAMPION improved cathode, 7500-hour Fluorescent Lamps you get more and longer lasting, color-correct light — reduce relamping and maintenance cost. For maximum illumination at minimum cost use CHAMPION Fluorescent and Slimline Lamps. Available in a complete range of sizes and colors.

For better LIGHTING—it's PANAMA

We represent leading manufacturers of lamps and lighting fixtures for industrial, commercial and residential lighting. Let us help you plan the most efficient lighting to meet any interior or exterior requirements.

Catalogues, calculating light rules and maintenance manuals available upon request.

PANAMA LAMP & COMMERCIAL CO., INC.

326 So. San Pedro, Los Angeles 13
Phone: Michigan 0318

325 - 9th St., San Francisco 3
Phone: MArket 1-3251

568 1st Ave. So., Seattle 4
Phone: MUtual 2554

• Since 1897

BRANCHES AND DISTRIBUTORS IN KEY WESTERN CITIES

TEAM SERVICE by U·S·Steel Supply speeds delivery!

WAREHOUSE SUPT.

TELEPHONE SALESMAN

INVENTORY ANALYST

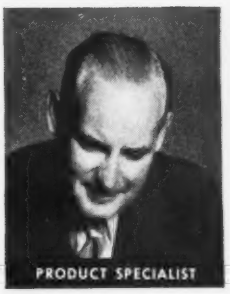
SALESMAN

DISTRICT MANAGER

RECEPTIONIST

OFFICE MANAGER

CREDIT MANAGER


PRODUCT SPECIALIST

WAREHOUSEMAN

ASS'T. DIST. MANAGER

TRAFFIC MANAGER

our "speed specialist" keeps your order on the move!

• As soon as your order is ready, our traffic manager gets it out of our warehouse and into your plant as fast as possible. If you specify delivery or routing instructions, he will see that they are followed exactly. If you leave the routing up to him, he will schedule delivery so as to give you the best possible protection in the matters of both cost and service.

When your order needs special handling, you can get the *personal* attention of our traffic manager through your U. S. Steel Supply salesman.

U.S. STEEL SUPPLY

DIVISION

Warehouses and Sales Offices:

LOS ANGELES • PORTLAND • SAN FRANCISCO • SEATTLE

UNITED STATES STEEL

industrial alcohol and stock feed from pear waste through fermentation, dehydration, and distillation. Alviso plant at which process was tested will be enlarged to handle 375 tons of pear waste daily. Value of products from one ton of waste is said to be about $10.

HOFFMAN EXPANDS TO THE EAST—Hoffman Radio Corp. will begin operations in August at a new $1,000,000 plant in Kansas City, with employment of about 1,000. Plant area will be 85,000 sq. ft. in size, of structural steel and concrete block construction.

75% MORE SPACE—K-F Development Co., manufacturers of potentiometers and carrier current radio and communication equipment, move from San Mateo to new quarters at 2606 Spring St., Redwood City, where their space is about 6,000 sq. ft., an increase of about 75% over the former location. Mrs. E. V. Dean, a large stockholder in the concern, has assumed the presidency, succeeding H. B. Fleming, now in business for himself.

PLANT CHANGES AND REARRANGEMENTS—Helipot Corp. moves into new plant, No. 3, at 721 Junipero Road, San Gabriel, a one-story building with 17,000 sq. ft. of floor area, and reassigns operations in Buildings No. 1, South Pasadena and No. 2, Pasadena.

PROPOSED PURCHASE—Blyth & Co., Inc., investment bankers, contracts to buy controlling interest in Pacific Public Service Co., subsidiary of Standard Oil of California, subject to approval of Securities and Exchange Commission. Purchase offer is $9,400,000. If sale is approved, investment firm may negotiate consolidation of Pacific Public Service, owner of Coast Counties Gas and Electric Co. and Natural Gas Co. of California, with Pacific Gas & Electric.

SPECIALTY STEEL PRODUCTS—Jessop Steel Co., Los Angeles, will continue expansion of its West Coast specialty steel operations with a long-range goal of establishing a manufacturing plant.

FURTHER EXPANSION—Sacramento Frosted Foods Co., Sacramento, may add Valley Frozen Foods, Stockton, to their operations, which include a plant at Yuba City. Present management will continue at Stockton, but products packed will be extended.

IDAHO

LUMBER MILLS PURCHASED—Potlatch Forests, Inc. of Lewiston, Idaho, purchases Twin Feathers Mill, Inc. and C. K. Industries, Inc., both of Kamiah, Idaho. The two mills employ approximately 300 and produce 60,000,000 board feet of lumber per year.

NEVADA

KENNECOTT COPPER PROJECTS—Kennecott Copper Corporation will open a new surface mine, the Veteran, in the Ely area near its Ruth pit. An earlier project, sinking of a 1,700-foot Deep Ruth vertical shaft, is continuing. Also most of the town of Ruth has now been moved to permit development of ore deposits at this location through two new shafts 575 and 785 feet deep. Current production of copper ore from the Ruth and Kimberly pits totals approximately 18,000 tons daily.

METAL WITH A FUTURE—Recovery of rhenium from copper deposits may supply need for platinum and tungsten substitutes, says J. B. Austin, head of U. S. Steel Corporation research lab. Rhenium has a melting grade of about 3160 deg. centigrade and a specific gravity of 21.04. Research staff of Kennecott Copper Corp., announce successful extraction of the metal on a laboratory scale and state the metal is present in the Utah pit at Bingham, Utah, and other Western copper mines.

NEW MEXICO

ROOFING PRODUCTS EXPANSION—Addition to Marvel Roofing Products, Inc., Albuquerque, will start production soon of a complete line of finished roofing materials. Company also manufactures dry felt from waste paper and sawdust, and employs 75.

AEC CONTRACT — American Car & Foundry Co., Albuquerque, remodels and equips plant taken over from Eidal

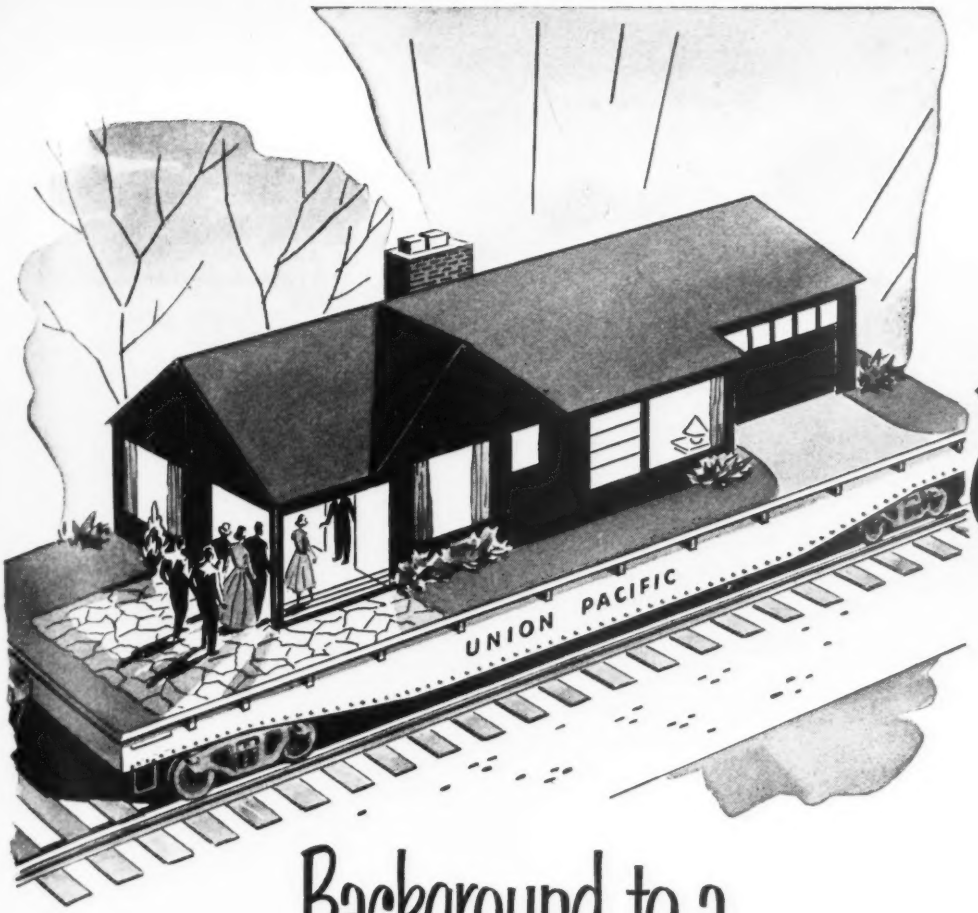
Why steam over supplier problems?

The answer's in the YELLOW PAGES!

You'll find suppliers—for both local and nationally distributed products—in the handy Yellow Pages. They're your quick, easy guide to whom you want... where they're located ... and how to get in touch with them. With "Classified" you have the business world at your fingertips!

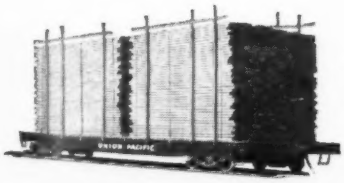
You'll find it fast in the YELLOW PAGES!

Pacific Telephone



UNION PACIFIC RAILROAD

Background to a HOUSEWARMING!



At last they've got their little "dream house"—the home which every American couple looks forward to. Every stick of lumber is a matter of personal pride, for never before was there a house quite like *this* one . . .

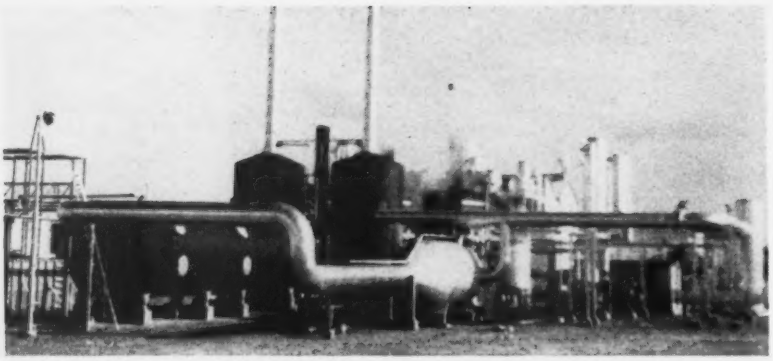
Somewhere in the Union Pacific West there were trees whose wood was meant to go into this particular house. There were other materials too, many others, that came over the Union Pacific rails just for this housewarming, for modern construction uses the products from all over a nation bound together by fine transportation such as Union Pacific provides.

So good luck in your new home, folks. *It's a real American home in more ways than one!*

* * *

Union Pacific is continually adding to its great fleet of flat cars, box cars and other carrying equipment to assure efficient on-time deliveries for the constantly growing building materials industry and the many other shippers depending on Union Pacific freight service.

UNION PACIFIC RAILROAD



WASTE GAS USED IN SULPHUR PRODUCTION—Imperial Sulphur & Acid Co. is considering construction of a sulphuric acid plant to supply the uranium processing plants of the Colorado Plateau, in connection with new $350,000 sulphur extraction plant near Farmington, N. Mex. Current production is about one ton per hour in molten form. Plant, designed and built by General Chemical Division of Allied Chemical and Dye Corp., converts hydrogen sulfide to molten sulphur, using waste gas supplied by neighboring El Paso Natural Gas Co. President of the firm is M. W. MacAfee; vice president and general counsel, Dudley Cornell; director and sales manager, H. W. Hunsaker.

Manufacturing Co. in preparation for prime contract work of an undisclosed nature for the Atomic Energy Commission. Original American Car & Foundry plant, a converted ballroom, is being retained.

OREGON

TIMBER-TECH BUYS PLANT—Timber-Tech Corp. acquires Douglas Fir Products Co. 23-acre plant at Lebanon and abandons plans to construct new plant at Eugene. Production of glued laminated and fabricated structural timbers will begin about May 15, with initial payroll of 100. Lumber will be supplied by Yellow Fir Lumber Co. and other mills in the vicinity.

PLYWOOD PROCESSING PLANT—Corvallis Plywood Corp. leases city-owned warehousing at the Corvallis airport. Plywood processing plant will begin operation in June or July, employing about 60 persons, with anticipated production of 3,000,000 ft. of finished plywood a month.

PULP MILL TO EXPAND—A $1,000,000 modernization program for the Coos Bay Pulp Corporation mill at Empire will include a new 80 x 100 ft. cordwood and log barking plant, new chipping and chip storage facilities, and new storage for unbarked cordwood. Mill will buy white fir, spruce and hemlock from small woodlot owners and wood salvage from logging operations, but may add Douglas fir later. Coos Bay Pulp Corp. is a subsidiary of Scott Paper Company.

APPLE EXPANSION PROGRAM—Apple Growers Assoc., Hood River, sets up an expansion program for next five years to cover rebuilding cannery, constructing new warehouse and cold storage area and extending sales and brokerage organization.

NEW CONTAINER MATERIAL—Springfield division of Weyerhaeuser Timber Co. will soon begin production of a new container material combining products of Weyerhaeuser's lumber and pulp divisions. A new plant employing 50 men will begin test operations in June. Specially processed veneer sandwiched between sheets of kraft container-board is cut according to customer's order and shipped flat. Containers fasten by tape, staples, or nails, and are suitable for products ranging from fresh fruit to explosives.

UTAH

NEW UTAH REFINERY TO SERVE PACIFIC STATES—Phillips Petroleum Company plans new $10,000,000 refinery at Woods Cross. Refinery will supply Pacific Northwest market now served by Phillips' Hillyard, Washington, refinery. Petroleum Terminal Co., a subsidiary, will receive refined products via Pasco-to-Spokane pipeline now under construction for Salt Lake Pipeline Co. Hillyard refinery will close around October 1.

EXPANSION PROGRAM FOR UTAH OIL REFINING—Utah Oil Refining Co. plans over $4,000,000 expansion of its facilities in 1953, to cover improvements at refinery in Salt Lake City, extended marketing facilities, and departmental expansions. Firm will continue participating in petroleum explorations with Stanolind Oil & Gas Co. at the rate of 25%, annual report states.

CLEAR CREEK-OREM PIPELINE—Utah Natural Gas Co. will begin construction of a $4,000,000 pipeline from Clear Creek field in Carbon County, Utah, to Orem, following recent approval by Utah Public Service Commission. Commission turned down application for construction of a 16-inch Orem to Salt Lake City line, and existing facilities will be used for this distance.

The 56-mile-long 18-inch line, to be completed by winter, will carry at least 50,000,000 cu. ft. of gas daily. Distributor will be Mountain Fuel Supply Co., under a 20-year contract calling for delivery of 50,000,000 feet daily and another 50,000,000 upon development of sufficient reserves. Suppliers to U.N.G. under 20-year contract are Three States Natural Gas Co. and Mid-Continent Petroleum Corp. Utah Natural Gas Co. is controlled by El Paso Natural Gas Co.

WASHINGTON

NEW QUARTERS FOR GLADDING, McBEAN—Gladding, McBean & Co., manufacturer of clay products, will build a new $200,000 office and warehouse in Seattle. Company will continue to occupy its present quarters, which were sold to an investor for about $125,000, until completion of new buildings next January.

WATERFRONT SITE—Market Coverage, Inc., manufacturer of sewage treatment chemicals, will build a 40,000 sq. ft. plant on a five acre waterfront site south of Everett.

NEW PLANT AT EPHRATA—General Tractor Co. begins construction of a $108,000 factory in Ephrata. The company will move its operation from Seattle.

NEW MAINTENANCE SHOP—Los Angeles-Seattle Motor Express of Seattle breaks ground for a new $200,000 maintenance shop at Seattle headquarters.

STEEL PLANT ADDS NEW SERVICE—Work begins on new span at Ryerson steel service plant in Spokane, which will add reinforcing bar fabricating operations. About 10,000 sq. ft. will be used for this purpose. Plant, formerly Inland Empire Steel Company, was purchased in 1951 by Joseph T. Ryerson & Son, Inc.

GAS COMPANY MERGER PLAN—Cascade Natural Gas Corp., incorporated in January, proposes merger of gas companies serving nine cities in Pacific Northwest. Cascade would take over Northwest Cities Gas Co. of Walla Walla as well as Bremerton, Wenatchee and Bellingham Gas Companies. A preliminary plan has been filed with S.E.C. Proposed merger will have to receive approval of regulatory bodies and stockholders.

WYOMING

MONOLITH SEEKS LARAMIE ALUMINA PLANT—Monolith Portland-Midwest Co. announces it is prepared to start new alumina-cement industry in Wyoming if government will turn back to private industry its experimental alumina plant at Laramie now used by Bureau of Mines. Proposal is to use plant for commercial production of alumina from domestic clays and anorthosite rock by a Monolith-perfected process.

NEW PHOSPHATE PROJECTS—San Francisco Chemical Co. undertakes exploration and development of underground mines at three locations in its phosphate rock holdings: one at Leefe, Wyoming, where open-pit operations will continue; another near Randolph, Utah; and a third at Montpelier, Idaho. Initial investment in the underground projects will be about $500,000. Western Phosphates $5,000,000 plant now under construction at Garfield will use up to 100,000 tons of rock annually from San Francisco Chemical.

CMP

THINSTEEL

TRADE MARK

CHIEF WAY

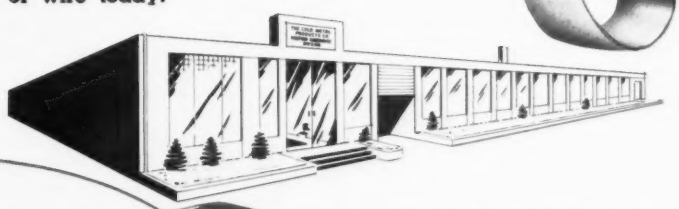
To Give

Stainless Strip Steel Inventory Cost

THE AXE

Why make heavy investments in cold rolled stainless strip steel? Just use our inventory in this conveniently located Los Angeles warehouse — call on us for your requirements, large or small, as you need it, and get quick service. You'll find all popular grades and some hard-to-find specialties such as High Tensil Spring Tempers or Mirror Finish in annealed chrome nickel grades, are on the shelf here.

Phone, write or wire today.



HERE'S FAST WAREHOUSE SERVICE

Low carbon cold rolled strip • Cold rolled electro zinc coated strip • Cold rolled shim steel • High carbon annealed spring steel • Hardened and tempered spring steel • Cold rolled annealed stainless strip • Cold rolled hi-tensile stainless strip • Flat wire • Hot dipped galvanized sheets • Coils—cut lengths • Custom slitting service for your metals.

Telephone Pleasant 3-1291

the Cold Metal Products co.

of California

6600 McKINLEY AVENUE • LOS ANGELES

POSTMASTER:
"Form 3547 Requested"
WESTERN INDUSTRY
609 Mission Street
San Francisco 5, Calif.

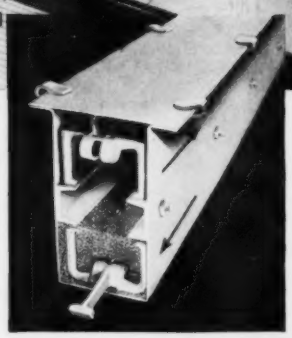
Acceptance under
Section 34.64 P. L. &
Authorized

NO WEATHER DAMAGE!
NO SPILLAGE!
NO CONTAMINATION!

REDLER Conveyors and Elevators Move, Place and Reclaim Bulk Chemicals Stored in Outdoor Tanks

Insecticide chemicals handled to and from outdoor storage tanks must be fully protected against the elements, foreign materials and loss of volume. S-A engineers provided an installation of REDLER Conveyor-Elevators to assure volume handling with cleanliness, efficiency and economy.

For the past 50 years S-A engineers have dealt successfully with all types of bulk materials handling problems. They have a complete line of bulk handling equipment from which to recommend the exact type of equipment best suited for your needs. *Write for a free survey by an S-A engineer.*



CALIFORNIA SPRAY-CHEMICAL CORPORATION
Richmond, California

At this plant fine-mesh bulk chemicals are deposited in and withdrawn from eight outdoor steel storage tanks. Three REDLER Elevators lift material through enclosed casing to top of tanks and distribute it through a long, horizontal REDLER Conveyor. Other horizontal REDLER Conveyors reclaim chemicals below the tanks for delivery to processing operations.

151 Mission St., San Francisco 5, Calif.
1007 E. Burnside St., Portland 14, Ore.

STEPHEN S-A ADAMSON MFG. CO.
2227 E. 37th STREET, LOS ANGELES 58, CALIF.

Washington Machinery & Stores Co.
7329 E. Marginal Way, Seattle 8

Bulk Material Handling Equipment